THE UNIVERSITY OF QUEENSLAND
AUSTRALIA

CREATE CHANGE

The University of Queensland Surat Deep Aquifer Appraisal Project (UQ-SDAAP)

Scoping study for material carbon abatement via carbon capture and storage

Supplementary Detailed Report

Wireline log analysis

30 April 2019

Authors

Mr Ahmed Harfoush, The University of Queensland
Mr Ifti Altaf, The University of Queensland
Ms Alexandra Wolhuter, The University of Queensland

Acknowledgements

This working document was prepared for The University of Queensland Surat Deep Aquifer Appraisal Project (UQ-SDAAP), a 3-year, $5.5 million project funded by the Australian Government through the Carbon Capture and Storage Research Development and Demonstration (CCS RD&D) programme, by Coal 21, and The University of Queensland. UQ-SDAAP would like to acknowledge Schlumberger for providing its Petrel software for use by the project and also to GeoTeric for providing use of their software. Thanks is also given to the Geological Survey of Queensland for providing data for the project, in particular for access to their QDEX Data platform, a Queensland digital exploration database.

Citation

Harfoush H, Altaf I & Wolhuter A (2019), *Wireline log analysis*, The University of Queensland Surat Deep Aquifer Appraisal Project – Supplementary Detailed Report, The University of Queensland.

Referenced throughout the UQ-SDAAP reports as **Harfoush et al. 2019a.**

Publication details

ISBN: 978-1-74272-252-8

Disclaimer

Contents

Tables

Figures

2. Executive summary

A major challenge for The University of Queensland Surat Deep Aquifer Appraisal Program (UQ-SDAAP) project was the determination of petrophysical properties, their calibration and lateral prediction into the deep Basin centre. This had to be accomplished from many vintages of data, seldom with complete documentation of data history or earlier processing or conditioning.

The project evaluated the wireline logs of 285 wells to assess the petrophysical properties needed to parameterise to the various static geological models. The key petrophysical properties assessed were volume of shale (285 wells), total and effective porosities (208 wells), and permeability (73 wells). Log Quality Control (LQC) was applied to the wireline logs. The process included data harmonisation, filtering noisy data, eliminating 'bad curves' and creating bad-hole, coal and ironstone indicator 'flags'.

The wells were allocated into four groups based on geological sector model areas each with its own database for analytical efficiency. The four databases are:

- Managed Aquifer Recharge Petrophysics Database (MARPD),
- Myall Creek Petrophysics Database (MCPD),
- Moonie Petrophysics Database (MPD), and
- Southern Depocentre Petrophysical Database (SDPD).

V_{shale} was calculated from gamma ray logs. Total and effective porosities were calculated using neutron-density, density, and/or compressional slowness logs, depending on log availability. Porosity calculation parameters were adjusted to match the total porosity with the measured core porosity. A confidence ranking indicates the number of methods used to calculate porosities. Wells with a high confidence were used to generate histograms and depth trends for assigning porosity to the various sector models. Permeability was calculated using one of four permeability scenarios calibrated to core and DST analysis.

The Blocky Sandstone Reservoir consists generally of clean sandstone with low V_{shale} ranging from 0.005 v/v to 0.398 v/v. V_{shale} tends to be greater where the Blocky Sandstone Reservoir is thin. Effective porosity (Φ_E) ranges from 0.093 v/v to 0.234 v/v. Φ_E values decrease with depth. Permeability ranges from 4.7 mD to 3943 mD, with the northern part of the reservoir (MARPD) exhibiting much higher permeability than the southern region (SDPD). The Moonie Field (MPD) exhibits medium permeability (average 114 mD). The northern wells have generally clean sands with streaks of muddy sandstone (facies SMA) laminae across the thickness of the Blocky Sandstone Reservoir. In the south, clay tends to become more interstitial and mixed within the sandstone matrix.

Stratigraphic terminology used in this report are summarised in Figure 1.

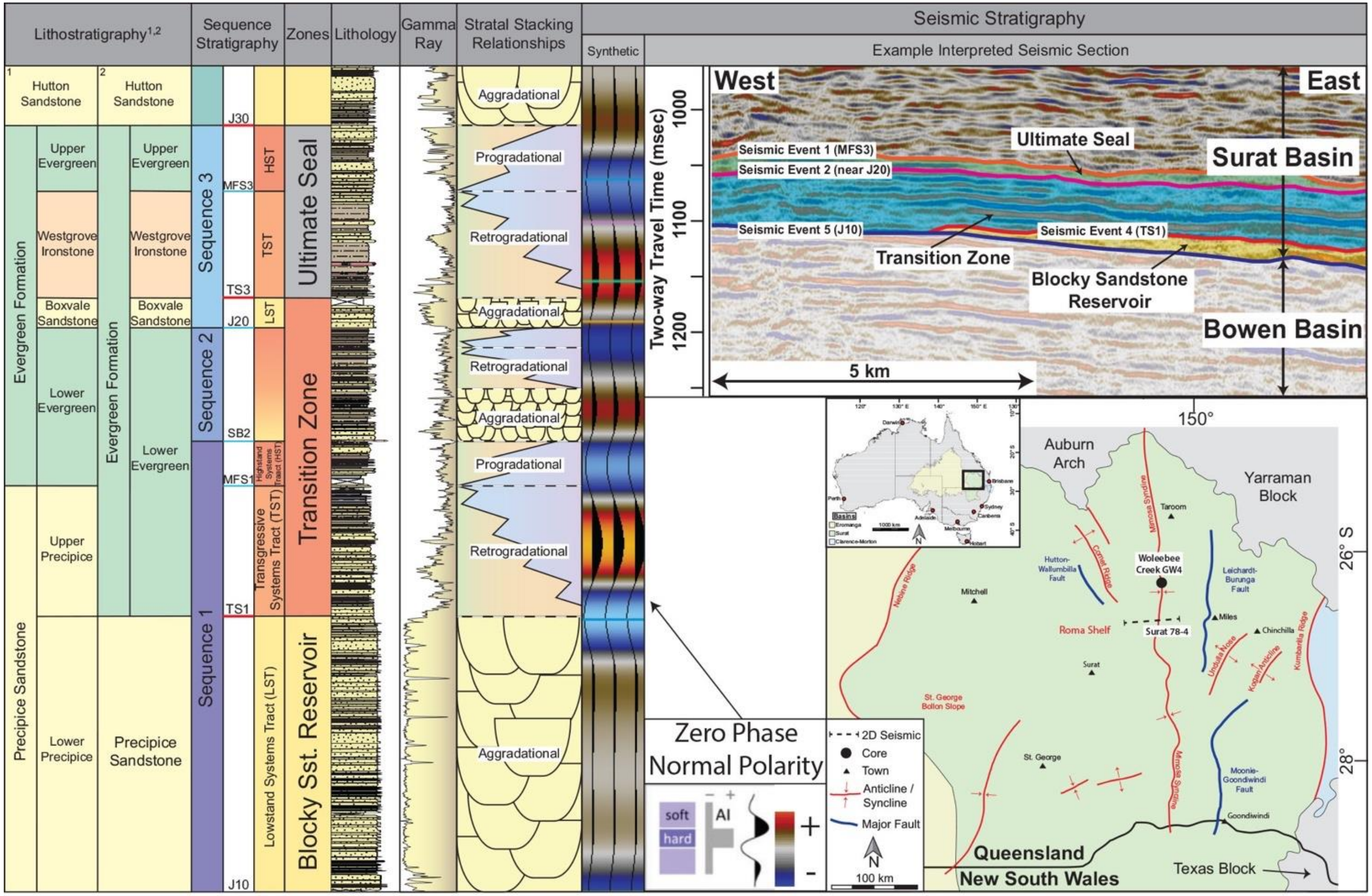
V_{shale} in the Transition Zone (TS1/J10 to MFS1 subzone) ranges from 0.162 to 0.908 v/v with an average of ~ 0.558 v/v. Effective porosity values are lower than for the Blocky Sandstone Reservoir, ranging from 0.002 v/v to 0.154 v/v with an average of ~ 0.061 v/v. Permeability varies greatly from < 0.01 mD to 1060 mD with an average of ~ 72.4 mD. Towards the south, the TS1/J10 to MFS1 subzone starts developing patches of lower V_{shale} values corresponding to the occurrence of the SB sand facies.

V_{shale} in the Transition Zone (MFS1 to SB2 subzone) ranges from 0.264 to 0.935 v/v with and average of ~ 0.667 v/v. Effective porosity varies from 0.001 to 0.146 v/v with an average of ~ 0.048 v/v. Permeability is mainly very low (<0.01 mD), with some wells having high averages up to 247 mD due to local facies heterogeneity.

V_{shale} in in the Transition Zone (SB2 to TS3 subzone) ranges from 0.238 to 0.947 v/v with an average of ~ 0.614 v/v. Effective porosity varies from < 0.01v/v to 0.135 v/v with an average of ~ 0.059 v/v. Permeability ranges from <0.01 mD to 1009 mD, with high permeability values corresponding to where the Boxvale Sandstone occurs.

The effectiveness of the Ultimate Seal relies on the presence of the ironstone beds that are abundant across the basin. V_{shale} ranges from 0.256 to 0.886 v/v with an average of ~ 0.571 v/v. Effective porosity ranges from <0.01 v/v to 0.198 v/v with an average of ~ 0.066 v/v. Permeability ranges from <0.01 mD to 1391 mD with an average of ~ 104.5 mD. The value is high due to the sandy sections above the ironstone beds, which were not observed in all the wells.

Figure 1: Stratigraphic terminology used to describe the core, along with the modelling zones, and a litholog from Woleebee Creek GW4. The dashed line represents the location of the 2D seismic data (after LA Croix et al. 2019)



[1]after Exon et al. 1967, Gray 1968, Rigby and Kanstler 1987, Martin et al. 2018
[2]after Mollan et al. 1972, Green et al. 1997, Wang et al. in press

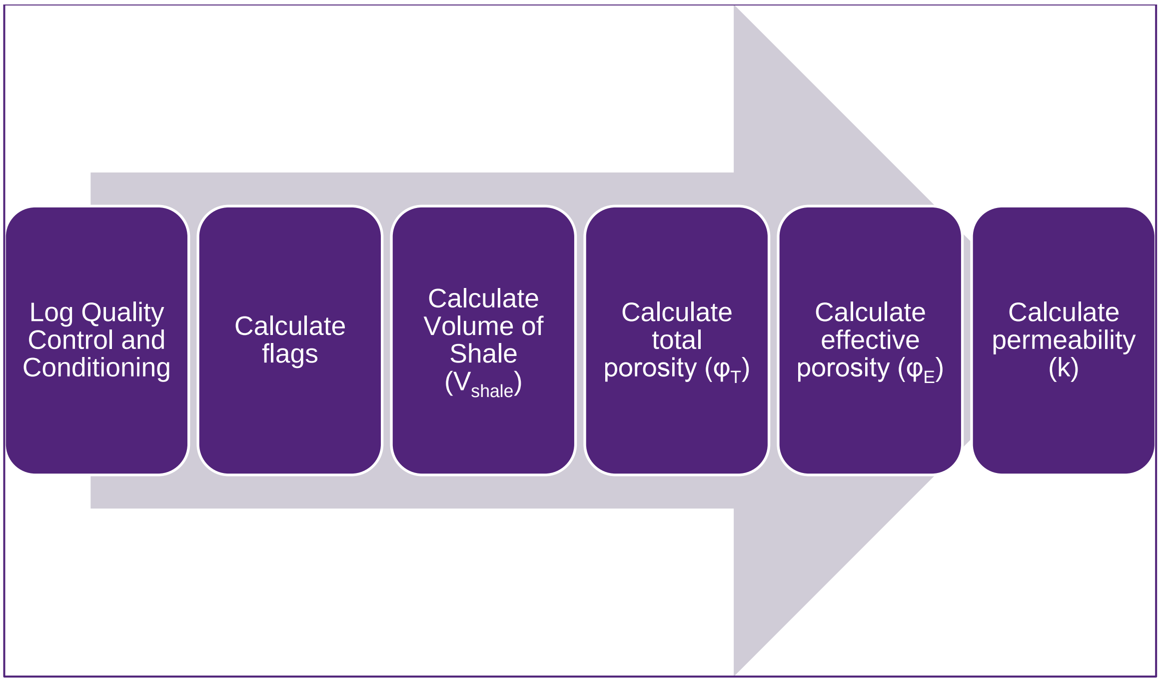
3. Introduction

The UQ-SDAAP evaluated the wireline logs of 285 wells to assess the petrophysical properties needed to parameterise to the various static geological models. The key petrophysical properties required included:

- Volume of shale (V_{shale})
- Total porosity (φ_T)
- Effective porosity (φ_E)
- Permeability (k)
- Flags for occurrences of coal and ironstone lithologies

Figure 2 shows the workflow we used to evaluate and interpret the wireline logs. First, we had to quality check the wireline logs as some of the logs were old (from the 1960s) and were acquired when different logging techniques were used. Also, some logs had to be digitised from poor quality paper logs. Part of the Log Quality Control (LQC) process also included harmonising the data into a database, ensuring the curves have consistent measurement units. Curves were filtered for noise and checked the validity of calibrations and environmental corrections. If found to be invalid, the logs were excluded from the analysis. Flags were created to identify bad-hole sections, coal beds, and ironstone occurrences.

Figure 2 Workflow for wireline log interpretation.



After flagging, petrophysical properties were calculated; from volume of shale to permeability. In oil wells containing hydrocarbons (mainly wells in the Moonie field), we also calculated oil saturation and resubstituted for fluid to recalculate porosities (to be explained in a later section). Thus, oil-bearing wells were not normally required for our study due to the proximity of non-oil bearing wells, in which case we excluded them.

The UQ-SDAAP project utilised Schlumberger's Techlog™ for petrophysical analysis and the Python programming language to run codes that assisted in conditioning and processing the data. NeuraLog™

software was used to digitise wireline logs where necessary. Petrophysical analysis was conducted on four groups of wells. The well grouping was based on geographical area with priority given to areas around the various geological sector models (e.g. Gonzalez et al. 2019b). A separate database for each well group was established to increase software efficiency. Different approaches in conditioning and assigning shale parameters were applied to each of the different groups/databases depending on geographic location, depth range, and the availability of various data types. The four different well groups were:

The managed aquifer recharge (MAR) area including the northern part of the Blocky Sandstone Reservoir – this data group is hereafter referred to as the “MAR Petrophysics Database” (MARPD)

Myall Creek area – this data group is hereafter referred to as the “Myall Creek Petrophysics Database” (MCPD)

Moonie field area – this data group is hereafter referred to as the “Moonie Petrophysics Database” (MPD)

The remaining wells in the centre, south and western parts of the Blocky Sandstone Reservoir distribution – this data group is hereafter referred to as the “Southern Depocentre Petrophysical Database (SDPD)

4. Wireline data inventory

Wireline logs were obtained from the Geological Survey of Queensland QDEX (Queensland Digital Exploration Reports) database and the Geological Survey of New South Wales DIGS® (Digital Imaging Geological System) database. Logs were in either digital format (las files) or in image format (tif or pdf formats), which were later digitised. Wells were selected primarily on being deep enough to have penetrated the stratigraphic intervals of interest (Precipice Sandstone and Evergreen Formation) and on the availability of digital format. The image format wells were digitised if they were deemed to fall in a critical area with limited data.

Table 8 in Appendix 1 lists the wells that were analysed, the logs available for each well in the zone of interest, and the properties that were calculated for each well. In addition, the table shows the quality of logs as if they were normalised/conditioned for our interpretations. We analysed 285 wells from which we determined V_{shale} for all, calculated total and effective porosities for 208 wells, and calculated permeability for 73 wells. Of the 285 wells, all had gamma ray logs, 132 wells had neutron logs, 179 had density logs, 91 had photoelectric factor logs, 230 had compressional slowness logs, and 204 had resistivity logs.

Figure 3 shows a map with the locations of the wells that were selected for petrophysical analysis. The map shows wells that penetrate the top of Blocky Sandstone Formation, wells that only penetrate the top Transition Zone (some logs were not deep enough to pick up the stratigraphic bottom of these formations), and wells that are available in our area of study in the Surat Basin but were not selected. There is a scarcity of well data in the centre of the basin towards the western edge of the Blocky Sandstone Reservoir distribution. There are wells located in the centre of the basin that we did not analyse due to log quality or stratigraphic coverage (Table 1).

Figure 3 *Map showing wells selected for petrophysical log interpretation. Wells in orange: have data in Blocky Sandstone Reservoir, in blue: have data in the Transition Zone but not in the Blocky Sandstone Reservoir, in red: available in the centre of the basin but were not analysed, in grey: wells available in QDEX database but not analysed.*

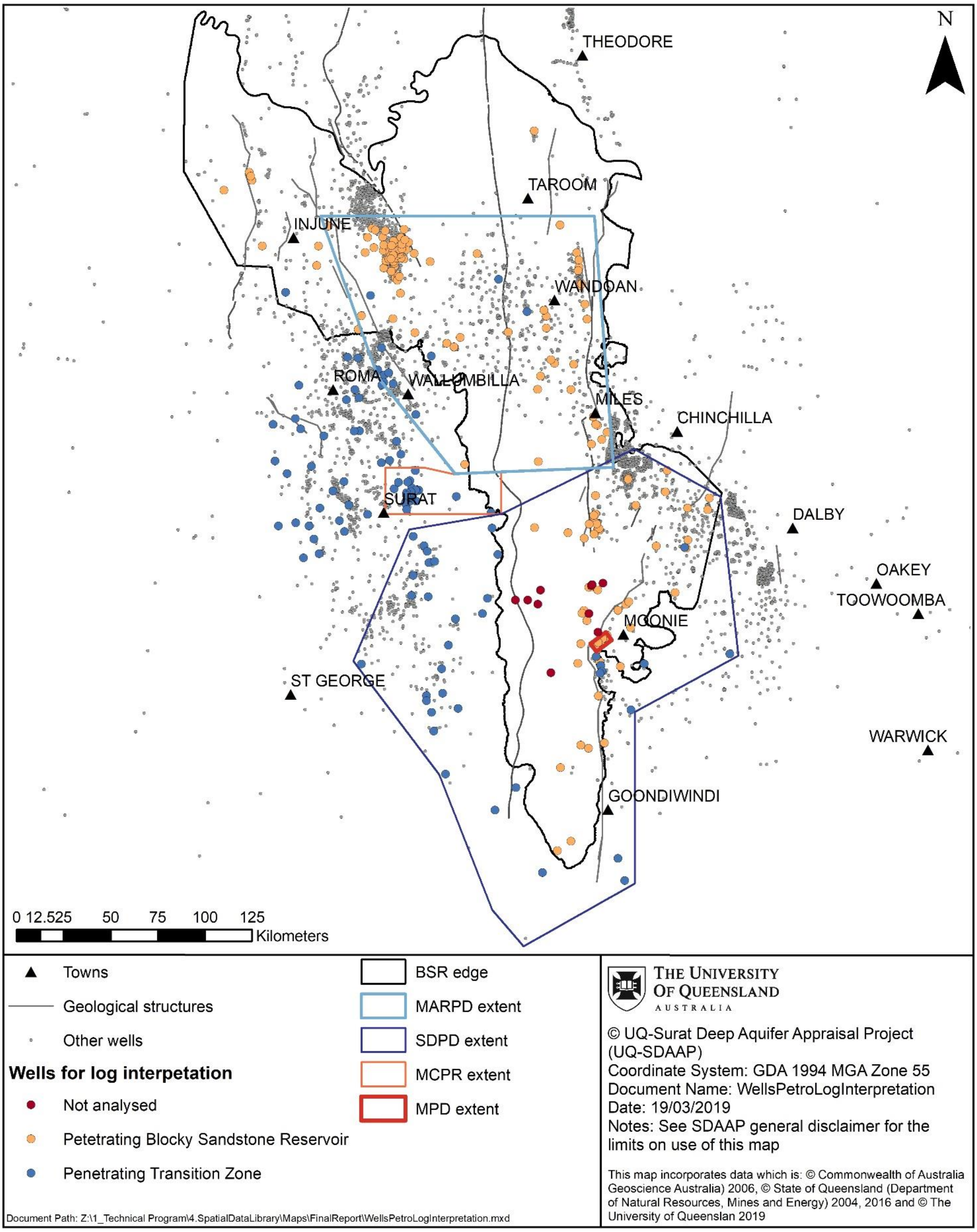


Table 1 Wells in the centre of the basin but not included in wireline log analysis for UQ-SDAAP.

Well	Reason for not using
CABAWIN 1	Only neutron log available, insufficient for proper porosity calculation. Used GR for calculating V_{shale}
CABAWIN 2	Available logs do not penetrate Blocky Sandstone Reservoir
TARTHA 1	Poor quality, large-scale undigitised sonic log
CABAWIN EAST 1	Available logs do not penetrate Blocky Sandstone Reservoir
MOOLANA 1	Does not penetrate the Transition Zone
ROMONA 1	Does not penetrate the Transition Zone
(MIRRI MIRRI) 2	Well data not available in QDEX
SOUTHWOOD 1	No GR curve present.
SURAT 2	Well data not available in QDEX
SURAT 4	Well data not available in QDEX

5. Log quality control and conditioning

The Log Quality Control (LQC) process included several steps to ensure the quality of the data for the petrophysical analysis. This included:

- Data harmonisation
- Filtering noisy data
- Eliminating bad curves
- Creating bad hole flags
- Data normalisation (for part of the basin)

The following subsections will briefly describe the reasons and methods for these processes and provide examples.

5.1 Data harmonisation

Over the years, wells have been logged by different wireline companies using different tools and technologies which has resulted in a variety of different names and mnemonics in the log outputs. As part of the data harmonisation process, we undertook a careful process to ensure that all attributes and units of measurement were consistent and directly comparable.

Table 2 shows a list of the different families of logs, and the harmonised mnemonic and measurement unit for that family.

Table 2 Harmonised curve names and units for different measurement families.

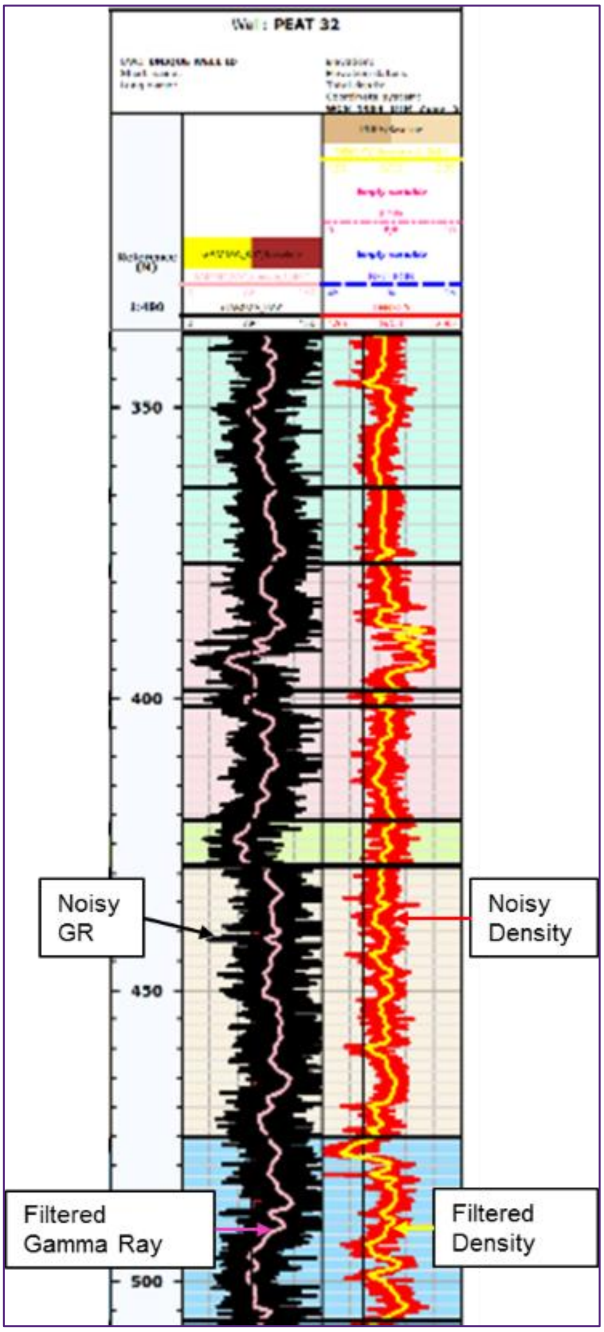
Measurement Family	Curve Mnemonic	Unit
Measured Depth	DEPTH	M
Bit Size	BIT	IN
Caliper	CALIPER	IN

Bulk Density Correction	DEN_COR	G/C3
Bulk Density	DENSITY	G/C3
Gamma Ray	GAMMA_RAY	GAPI
Deep Resistivity	RT	OHMM
Medium Resistivity	RMED	OHMM
Shallow Resistivity	RSHAL	OHMM
Micro Resistivity	RXO	OHMM
Neutron Porosity	NEUTRON	% (Limestone)
Photoelectric Factor	PDPE	B/E
Compressional Slowness	SONIC	US/F
Spontaneous Potential	SP	mV
Temperature	TEMP	DEGC

5.2 Filtering noisy data

Some wireline logs in certain wells appeared “noisy” for a number of potential reasons e.g. applying incorrect data filters in the field during acquisition, faults in tool electronics, using incorrect logging speed etc. In some cases, some of the ‘noisy’ data was deemed to be useful if a suitable filter was applied. Examples of such wells are Peat 27, Peat 32, Durham Ranch 13, Durham Ranch 15, Durham Ranch 10 and Taroom 17. Figure 4 shows an example of ‘noisy’ gamma ray and density logs for the Peat 32 well, overlain by the filtered gamma ray and density curves.

Figure 4 Example of noisy logging before and after filtering from the Peat 32 well.



5.3 Eliminating bad curves

We excluded wireline logs that had a “bad” response through a large section of the stratigraphic interval of interest (Transition Zone and the Blocky Sandstone Reservoir). The reasons for bad logs may include:

- Logging tool failure
- Incorrect wireline tool calibration
- Poor digitisation of the wireline log
- Logged interval was inside casing

Figure 5 and Figure 6 show examples of bad wireline logs. Figure 5 compares a bad compressional slowness log from the Kogan 1 well with the Kogan South 1 well that displays a good response of the compressional slowness log. In Kogan 1, the compressional slowness is always offset towards slower values in all formations, which indicates a bad tool response. This could be for a number of technical reasons during acquisition. Figure 6 shows the wireline logs of the Charlotte GW2 well. The casing shoe is marked in the figure. There is density and photoelectric data with an invalid formation response plotted above the casing, as the tool is reading casing/cement at that location. We eliminated such data before performing our petrophysical log interpretation.

Figure 5 Comparison between the sonic log response in the Kogan 1 well (bad data) and the Kogan South 1 well (good data).

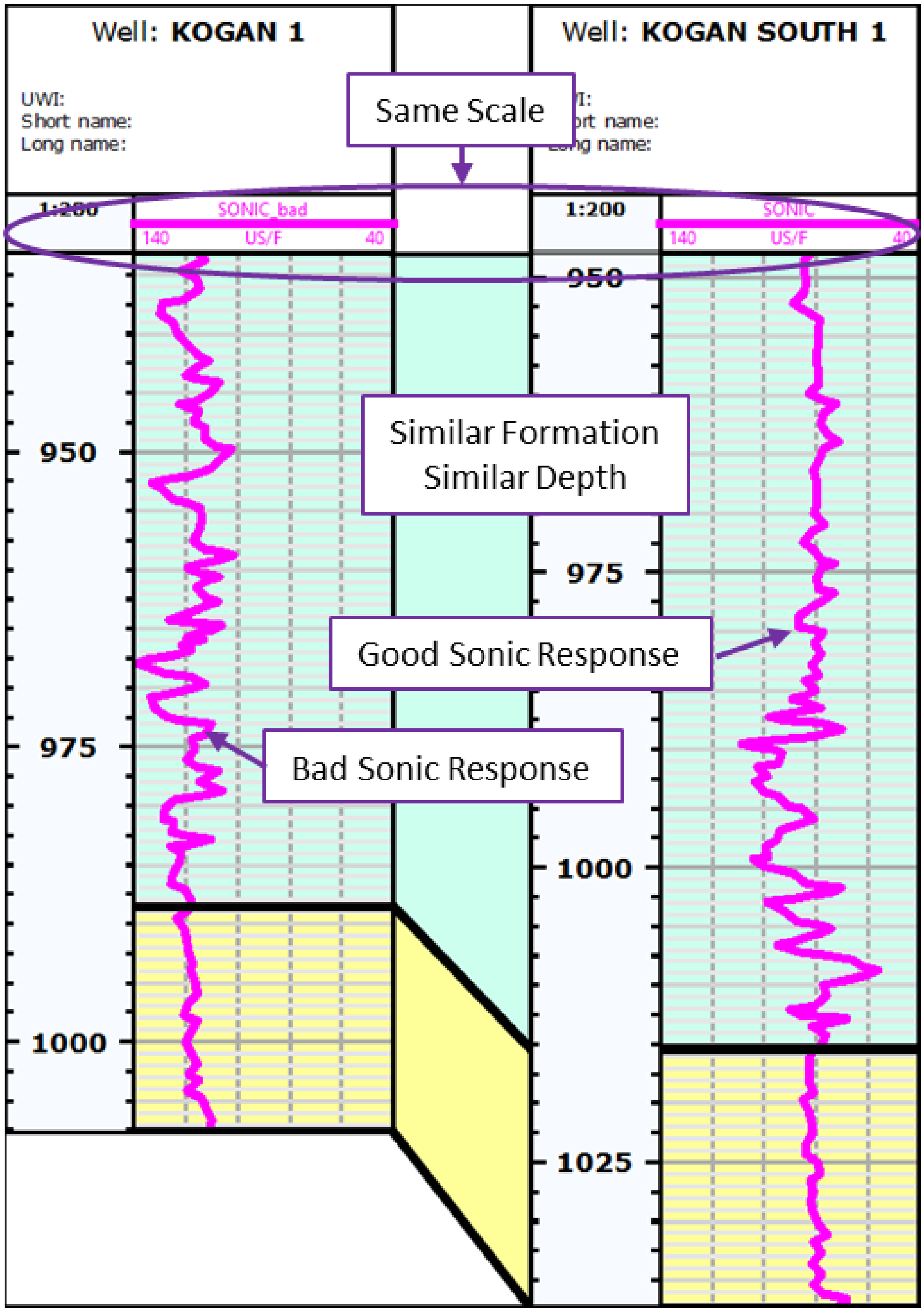
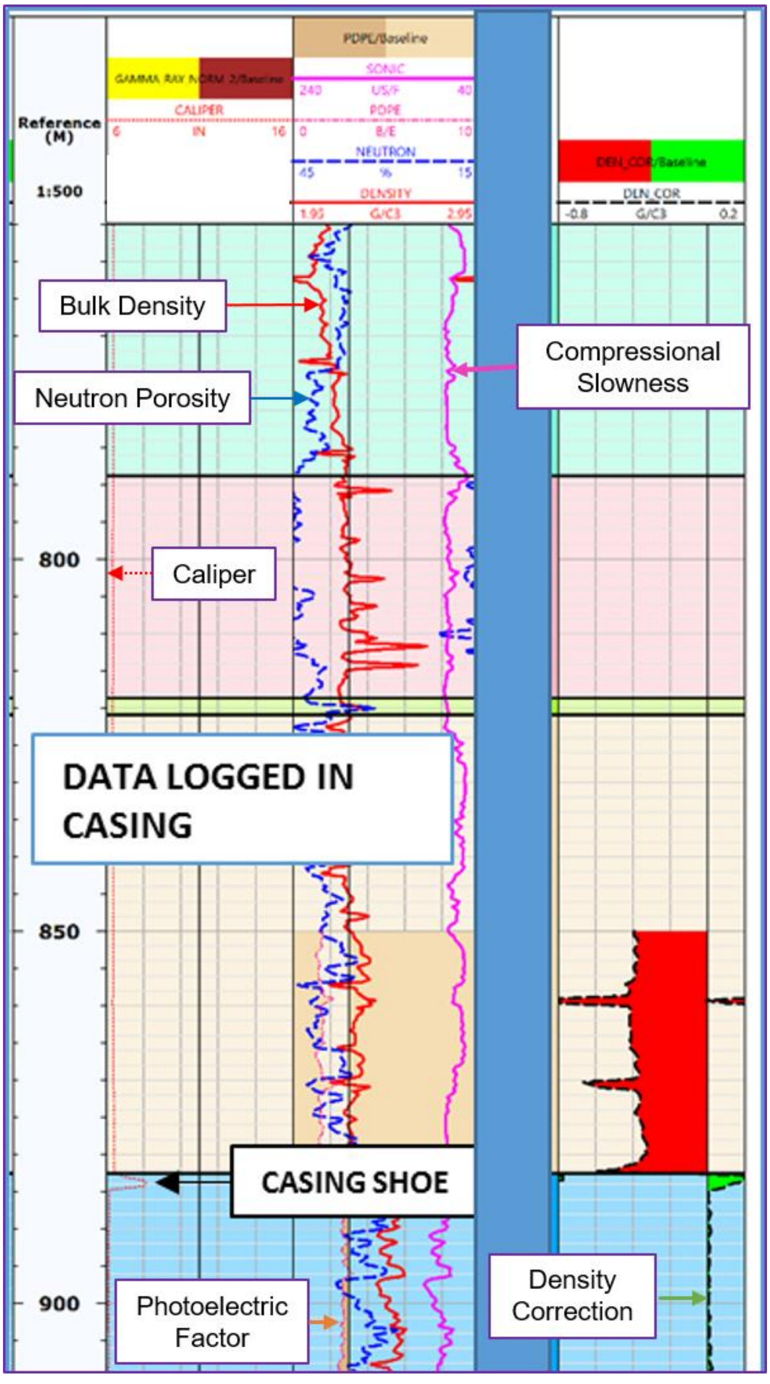


Figure 6 An example of wireline data logged in casing from the Charlotte GW2 well.



5.4 Creating bad hole flags

Apart from the log response being poor due to tool failures, on some occasions the borehole conditions affected the tool readings making them erroneous. Such examples occur with density and neutron logs, which are affected by washout and hole rugosity. Thus, we created a bad hole flag to identify the places where these logs were affected by the hole quality and should not be trusted. The criteria for creating the bad hole flag, BH_FLAG, are as follows:

CALIPER Spike cut-off: 0.15 in, or

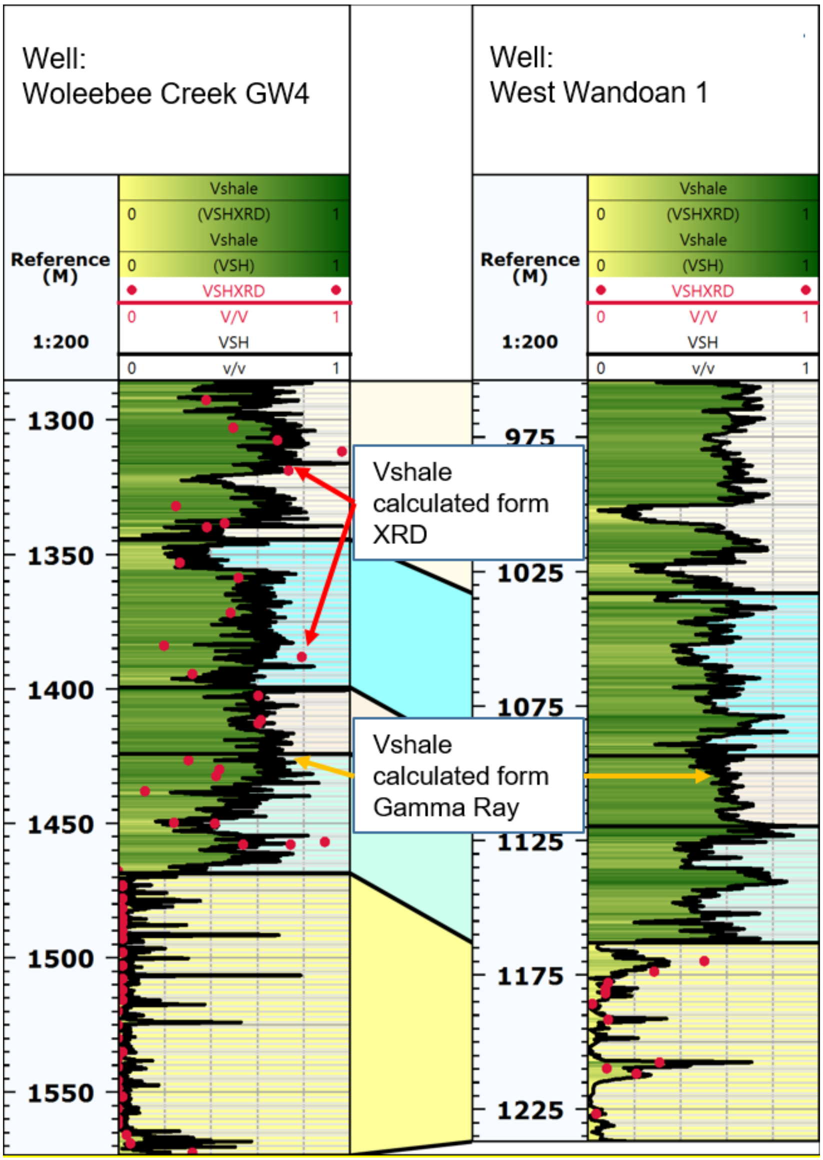
-0.2<DEN_COR<0.2

6. Data normalisation

6.1 Reasons for normalisation

We started the wireline interpretation process using the MAR dataset. In this dataset, two wells had XRD data, Woleebee Creek GW4 and West Wandoan 1. From the XRD data, we calculated the volume of clay for the measured depths and converted it into a volume of shale (using the V_{shale} = Vcl * 1.67 approximation). We then adjusted the gamma ray parameters for a V_{shale} calculation (gamma ray sand and gamma ray shale) so that the V_{shale} curve matched the V_{shale} points from XRD. Figure 7 shows the V_{shale} from GR and from XRD for both wells from the top of the Ultimate Seal to the base of the Blocky Sandstone Reservoir. Note that across the whole section there is no "pure shale" (where V_{shale} is equal to one). Based on the cuttings' descriptions from wells in the MAR area, no observations of pure shale were recorded and the finest grain size observed was silt. Therefore, shale parameters we deduced from the Woleebee Creek GW4 well and the West Wandoan 1 well to calculate petrophysical properties which were then applied to the remaining wells in the MAR area.

Figure 7 A comparison between V_{shale} calculated from XRD and V_{shale} calculated from gamma ray, for the wells West Wandoan 1 and Woleebee Creek GW4.



Some of the challenges of using the same parameters across the whole region were:

- The wells used for the petrophysical analysis of the MAR area were of different vintage (1960s to 2000s) and thus had been logged using different generations of tools
- The wells had been logged by different wireline contractors and with different tools and accuracies
- The environmental corrections that have been performed on different wells are unknown

As a result, normalisation was required in order to standardise the log responses as best as possible, while honouring regional depth trends.

6.2 Datasets normalised

For the MAR area dataset, we predominantly normalised gamma ray logs, since these logs are mostly affected by mud type, age of tool, type of sensor, and quality of calibration. We had to normalise some neutron logs (mainly due to differences in the logging generations and environmental corrections), density logs (due to different tool vintages), and sonic logs.

Even though the outcome of normalisation for the MARPD was helpful, it was a time consuming process that was impractical to repeat for the other datasets, thus we used other techniques for the other datasets as explained below. The impact of normalisation in the MAR area was that we were subsequently able to use the same parameters for the whole database. It also had a positive impact on the predictability of electrofacies using neural networks (La Croix et al. 2019c).

In the MCPD, we encountered pure shale sections in most logs and we were able to deduce shale parameters for each well, thus we did not need to normalise the data.

For the MPD we compared sonic, density and resistivity data from the different wells within the same stratigraphic zones and determined that no normalization was required except for a few wells. Because the MPD area has a high well density we could afford to simply exclude these wells from the analysis without influencing the model results. Neutron data was found to be usable from only four newer wells as the older data was logged in ‘counts’ and could not be converted to neutron porosity. Gamma ray logs are particularly important to the project for the facies prediction (La Croix et al. 2019c) and for the MPD they required normalization.

Normailisation was not implemented for wells in the SDPD (southern part of the Blocky Sandstone Reservoir distribution). Instead, each well was interpreted individually and then checked for outliers. Wells deemed to be outliers were either recalculated or excluded.

6.3 Literature on normalisation

Many literature reviews on the normalisation of wireline logs are available, Aly et al. 1997; Ren et al. 2014; Knox & Neinast 1974; Bornemann & Doveton 1981; and Shier 2004.

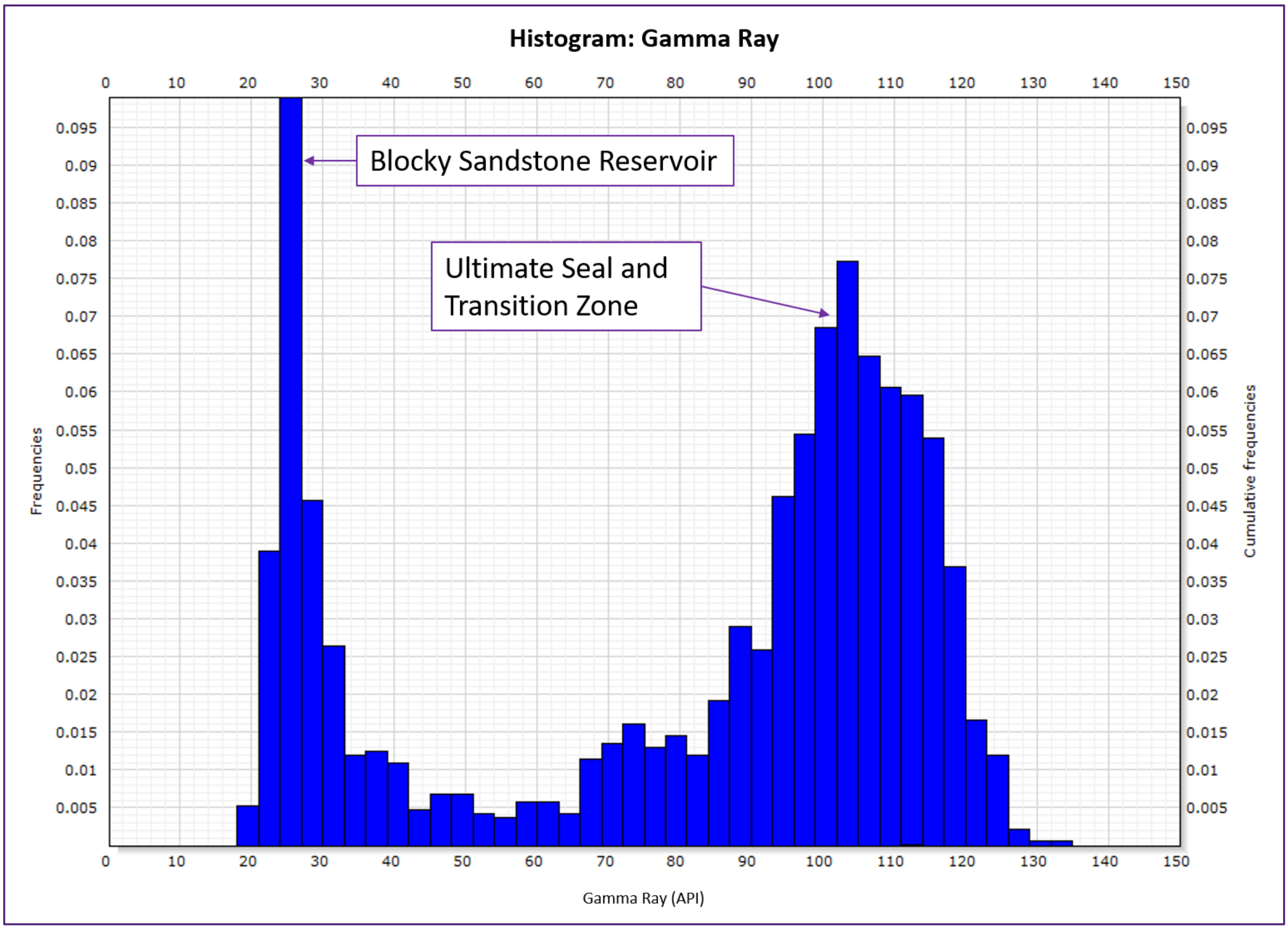
Shier 2004 provides a detailed description of the different methods used for normalisation, such as statistical normalisation, big histogram method, type well method, and neighbour comparison. He also documents the different techniques and tools used for well to well comparisons of different log types, and factors affecting planning for normalisation such as geological and depth trends as well as the presence of different facies. He provides guidelines for normalisation to minimise errors. The procedure of Shier 2004 was used as the guideline to normalise the MARPD and the gamma ray of the MPD in the UQ-SDAAP project.

6.4 Normalising gamma ray

According to Shier 2004, it is important to check for geographical trends in gamma ray values on maps and then cluster the wells accordingly before starting the normalisation process. For the MPD, the wells were located in a confined geographical location, thus we clustered all wells together. In the MARPD, we created three clusters.

Looking at the histogram of gamma ray for any well within the stratigraphic sequence, there was a bimodal distribution as shown in the histogram of gamma ray for the Trelinga 1 well in Figure 8. The first mode (lower value) comes from the facies of the Blocky Sandstone Reservoir, while the second mode comes from the facies of the Transition Zone and the Ultimate Seal.

Figure 8 Histogram for gamma ray of the Trelinga 1 well, in the Ultimate Seal, Transition Zone and Blocky Sandstone Reservoir.



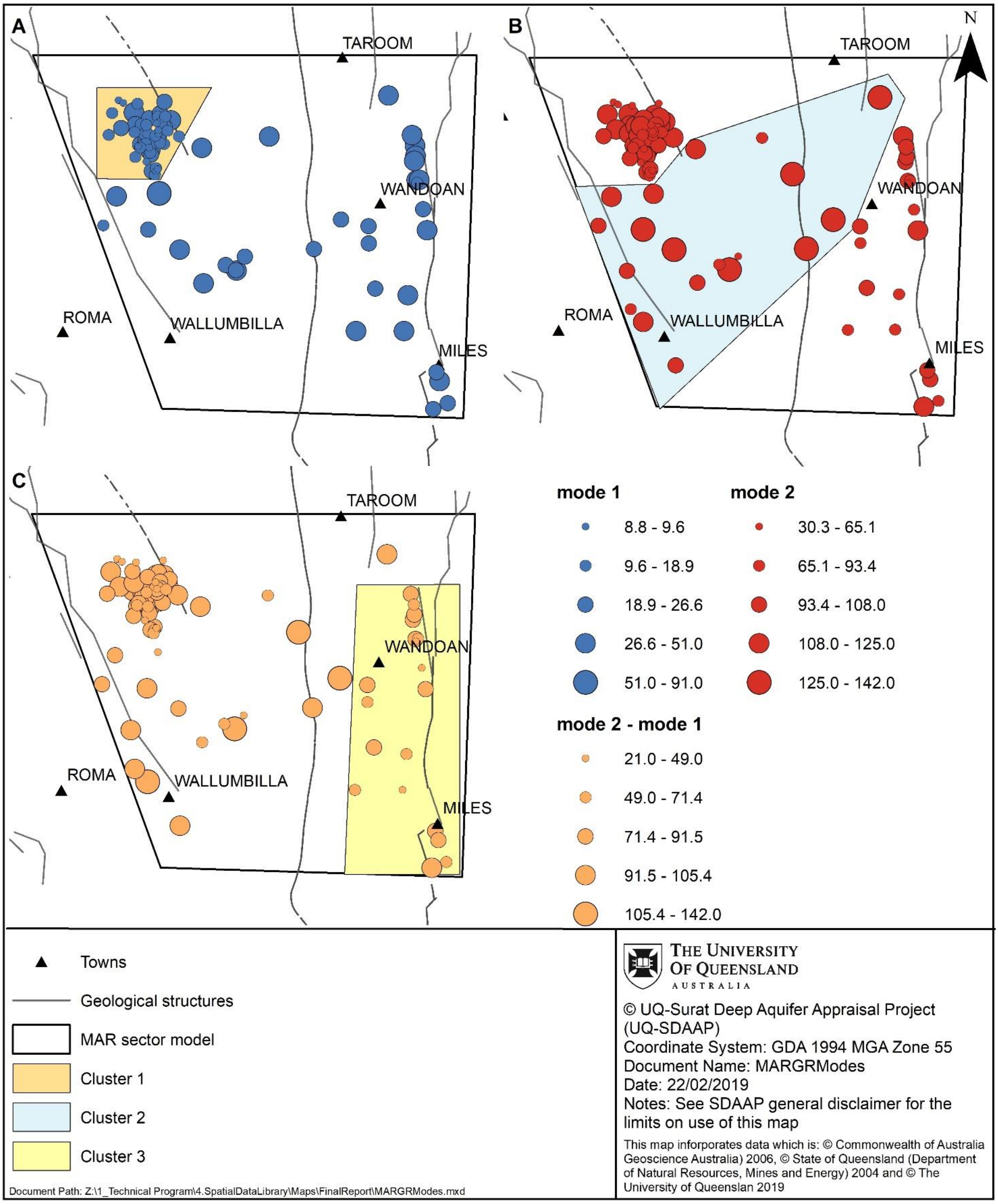
Three maps were created to determine the clustering of the wells in the MARPD. The first map shows the value of the first mode (Figure 9 (A)), the second map shows the values of the second mode (Figure 9(B)), and the third shows the difference between both modes for each well (Figure 9 (C)). The three MAR clusters were:

Cluster 1: Spring Gully /Durham Ranch Area (North West of the MAR Area)

Cluster 2: Centre of the MAR Area

Cluster 3: East of the MAR Area

Figure 9 *(A) Map showing the values of the first mode of the gamma ray histograms for the wells in the MARPD, defining Cluster 1; (B) Map showing the values of the second mode of the gamma ray histograms for the wells in the MARPD, defining Cluster 2; and (C) Map showing the difference between the two modes of the gamma ray histograms for the wells in the MARPD, defining Cluster 3.*



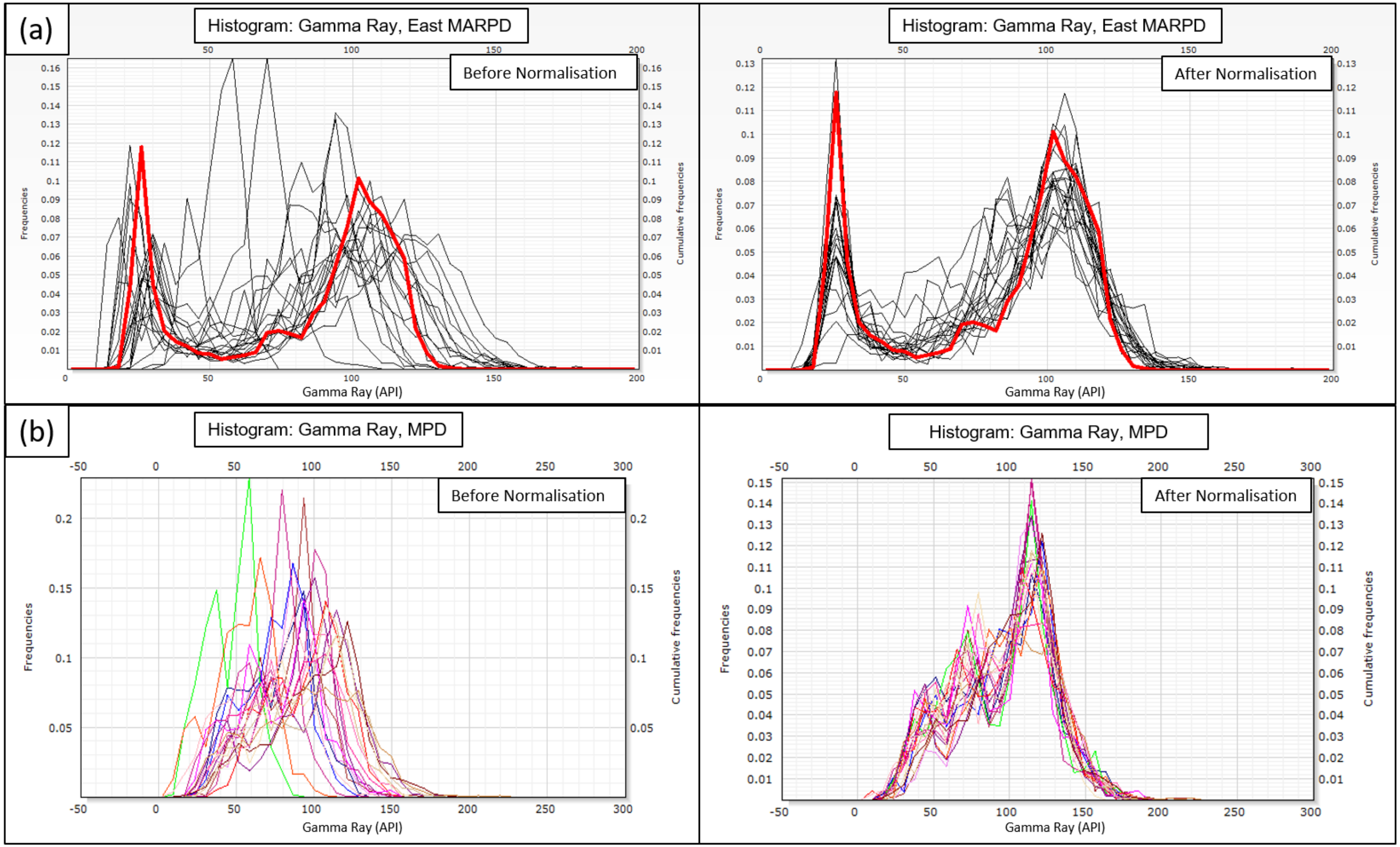
After grouping the wells into clusters, a combination of the statistical normalisation and type well methods were used, as per Shier 2004. For every cluster, a type well was selected which had a histogram central to the histograms of the different wells. Then a statistical normalisation was performed to match the shoulders of the histograms to the histogram of the type well.

Table 3 shows the type well selected for each cluster. Figure 10 (A) shows the histograms of the wells of the cluster east of MARPD before and after normalisation, while Figure 10 (B) shows the histograms for the MPD cluster before and after normalisation. The logs that were normalised are referred to as "N" in the data inventory (Table 8).

Table 3 Type wells for well clusters grouped for gamma ray normalisation.

Wells cluster for normalising gamma ray	Type well
Spring Gully /Durham Ranch Area	Spring Gully 16
Cluster 2: Centre of the MAR Area	Woleebee Creek GW4
Cluster 3: East of the MAR Area.	Trelinga 1
Moonie field	Moonie 39, Moonie 40, Moonie 41, Moonie 43 and Moonie 44

Figure 10 Examples of gamma ray histograms before and after statistical normalisation using type well(s). (A) For the cluster east of MARPD. (B) For MPD.



6.5 Normalising neutron

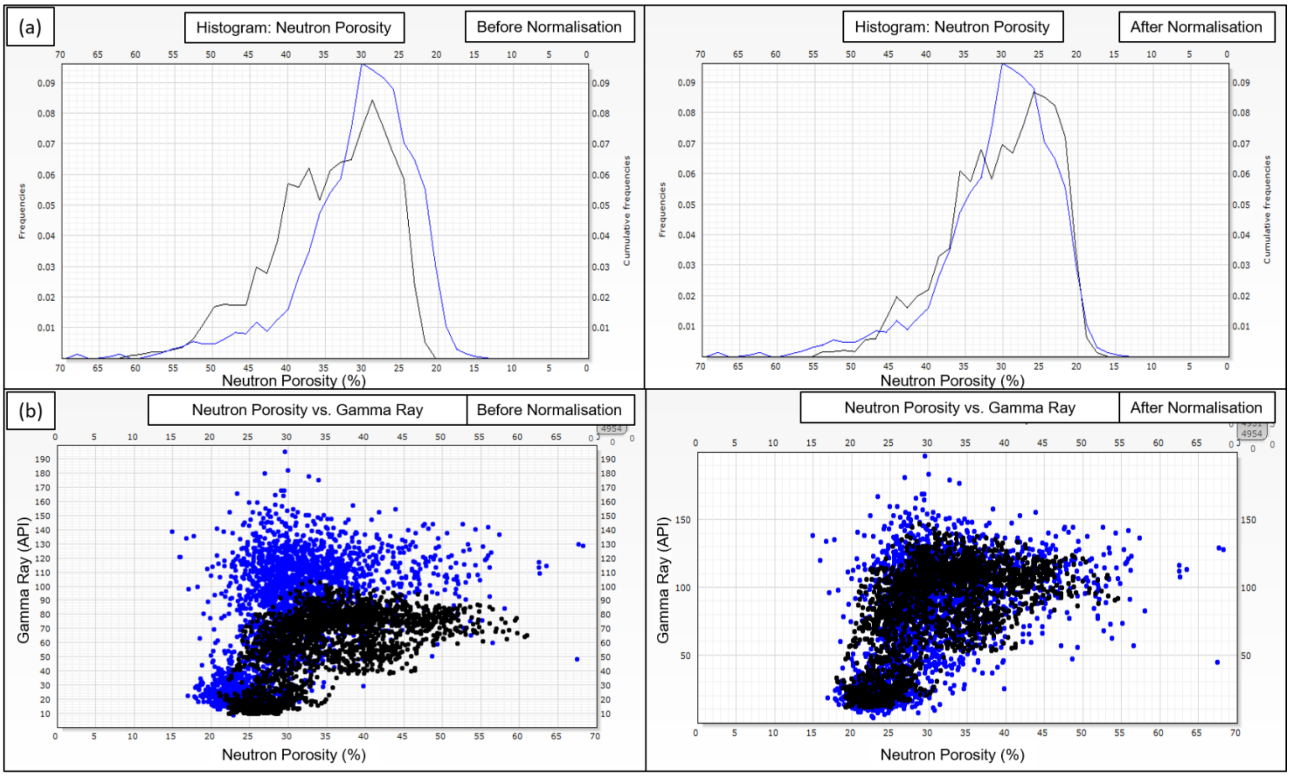
The neutron log can be affected by the logging environment, porosity, presence of gas/hydrocarbons/water, and the presence of clay. Since the fluid present in the MAR dataset area is always water, we only needed to have regard to the clay content and porosity during the normalisation process. Thus, we used the following workflow when normalising neutron logs:

1. We created a depth trend base line from the neutron data for the Blocky Sandstone Reservoir
2. We identified the wells that lie on the trend base line, and considered them as type wells
3. We used these type wells to normalise the neutron curves of the other wells using the statistical histogram method, using the following criteria:
4. Check: The type well should be in the same gamma ray cluster as the well to be normalised (since the clusters are meant to share the same clay characteristics)
5. Check: The type well should be of a similar depth to the well to be normalised (since neutron measures porosity that is depth dependent)
6. We created a cross plot of gamma ray vs. neutron before and after normalisation, to compare the cloud of data with the type well before and after normalisation, as an indicator of the quality of the normalisation

Figure 11 shows the normalisation process for the Spring Gully 41 well using the Durham Ranch 23 well as a type well. Durham Ranch 23 was chosen as a type well because the neutron values in the Blocky Sandstone Reservoir fell on the baseline, it is in the same geographic location as Spring Gully 41, and has the Blocky Sandstone Reservoir at about the same depth as it is in the Spring Gully 41 well. Figure 11 (A) shows the histograms of the neutron logs before and after normalisation. Figure 11 (B) shows the neutron vs. gamma ray cross plots before and after normalisation.

As expected, after normalisation the data clouds from both wells showed better correlation. The logs that were normalised are referred to as “N” in the data inventory (Table 8).

Figure 11 (A) Histogram of neutron logs for the Spring Gully 41 well and Durham Ranch 23 (type well) before and after normalisation. (B) Cross plot of neutron porosity (x-axis) vs. gamma ray (y-axis) for the Spring Gully 41 well and Durham Ranch 23 (type well) before and after normalisation.



6.6 Normalising density

The density logs were normalised using a similar method to the neutron logs as per the workflow below:

1. We created a depth trend base line from the density data for the Blocky Sandstone Reservoir
2. We identified the wells that lie on the trend base line, and considered them as type wells
3. We used these type wells to normalise the density curves of the other wells using the statistical histogram method, using the following criteria:
4. Check: The type well should be in the same gamma ray cluster as the well to be normalised (since the clusters are meant to share a similar structure and thus control lithology)
5. Check: The type well should be of a similar depth to the well to be normalised (since porosity is depth dependent)
6. The logs that we normalised are referred to as “N” in the data inventory (Table 8).

6.7 Normalising compressional slowness

The compressional slowness logs were normalised in a similar method to the density logs as per the workflow below:

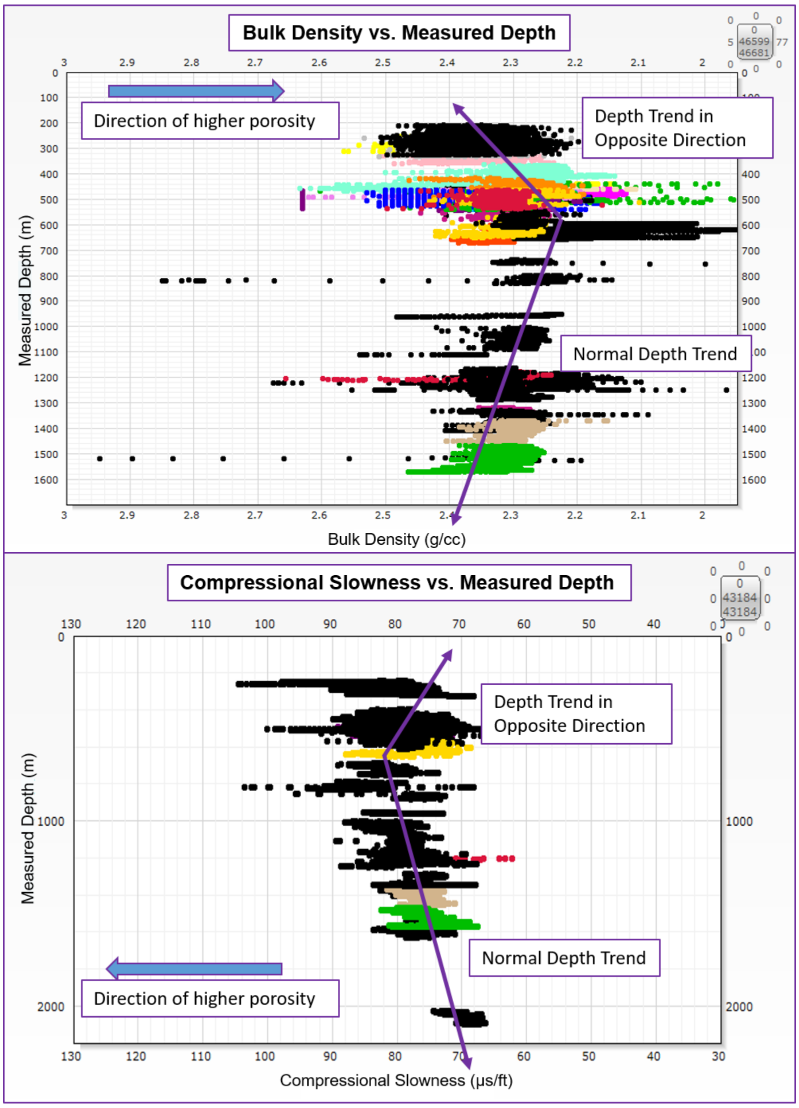
1. We created a depth trend base line from the compressional slowness data in the Blocky Sandstone Reservoir
2. We identified the wells that lie on the trend base line, and considered them as type wells
3. We used these type wells to normalise the compressional slowness curves of the other wells using the statistical histogram method, using the following criteria:

4. Check: The type well should be in the same gamma ray cluster as the well to be normalised (since the clusters are meant to share similar structure and thus control lithology)
5. Check: The type well should be of a similar depth to the well to be normalised (since porosity is depth dependent)
6. The logs that we normalised are referred to as "N" in the data inventory (Table 8).

6.8 Spring Gully/Durham Ranch Area Anomaly:

While setting the depth trend baseline for the compressional slowness and density data, we detected an anomaly in the depth trend in the Spring Gully/Durham Ranch Area. In a normal baseline, compressional slowness decreases and density increases with depth. In the Spring Gully/Durham Ranch Area the profile is reversed. Figure 12 shows this anomaly in the density and compressional slowness trend lines for the wells in the MAR area.

Figure 12 Figure showing depth trends for density and compressional slowness for wells in the MAR area, showing an anomaly at the wells in the Spring Gully/Durham Ranch Area.



Further study is needed to determine the reason behind this phenomenon in the Spring Gully/Durham Ranch area. This area shows different compositional and textural information in the cuttings' descriptions, such as higher clay content and different sorting than the remainder of the MAR area. There is also evidence from the operators that the Blocky Sandstone Formation is highly fractured in this area.

6.9 Residual maps

Once the normalisation process was completed, a residuals map was created to show the change in the mean values of the logs before and after the normalisation. According to Shier 2004 , these residual maps should be random, giving evidence that the normalisation process did not bias the data.

Figure 13 to Figure 16 show the residual maps for the normalisation process of the gamma ray, neutron, density and compressional slowness curves respectively. The maps show a random behaviour.

Figure 13 Residual map for the gamma ray normalisation process.

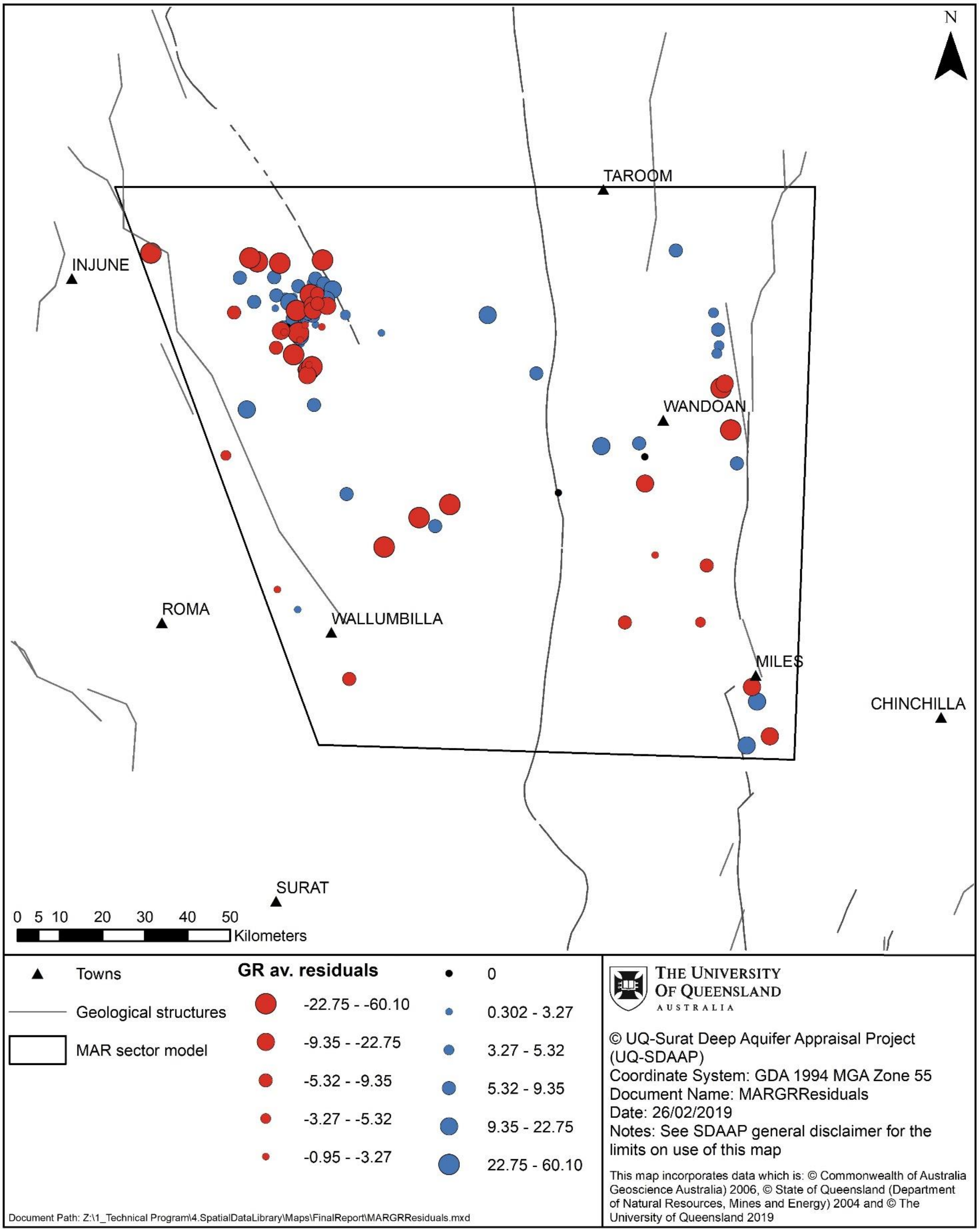


Figure 14 Residual map for the neutron normalisation process.

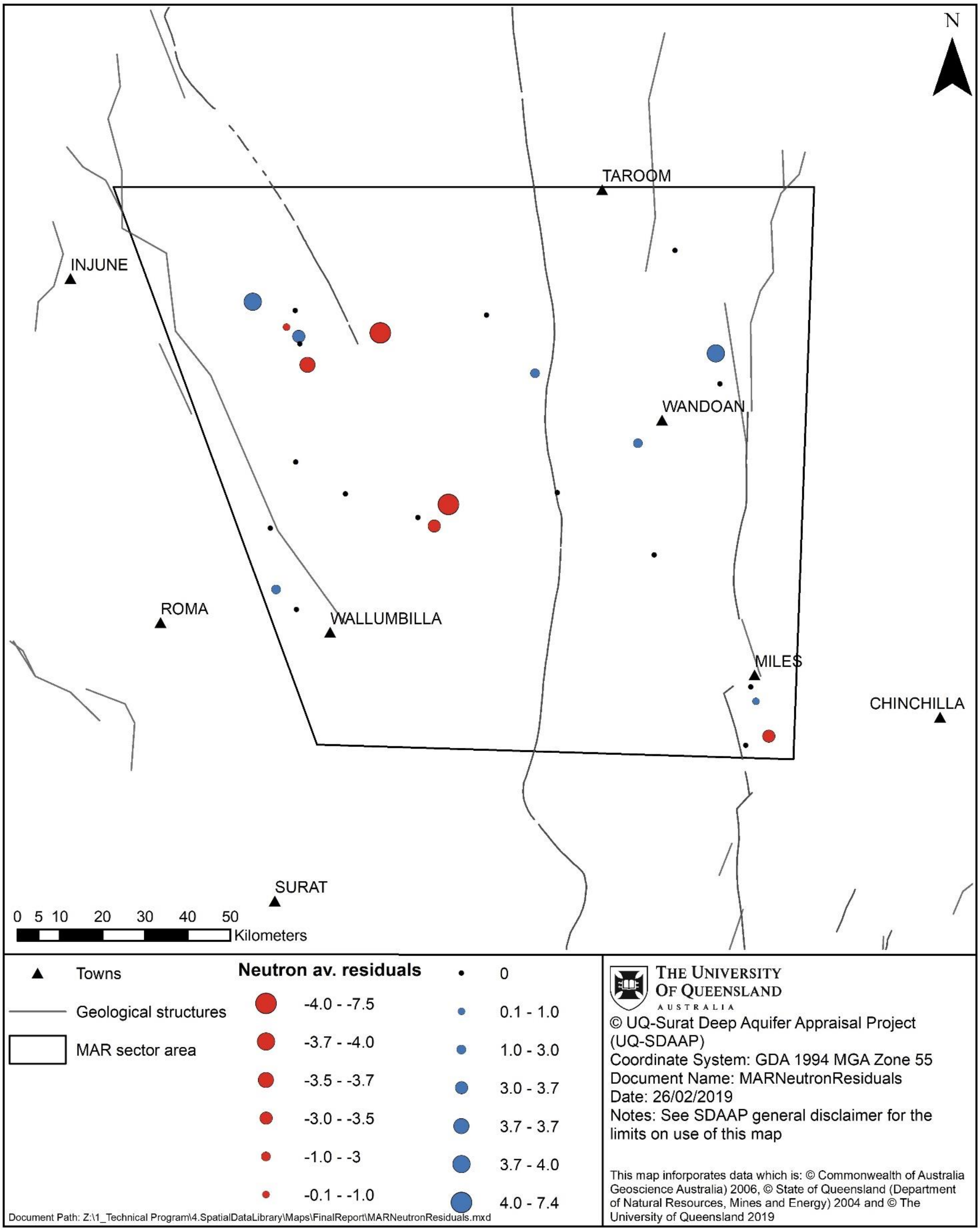


Figure 15 Residual map for the density normalisation process.

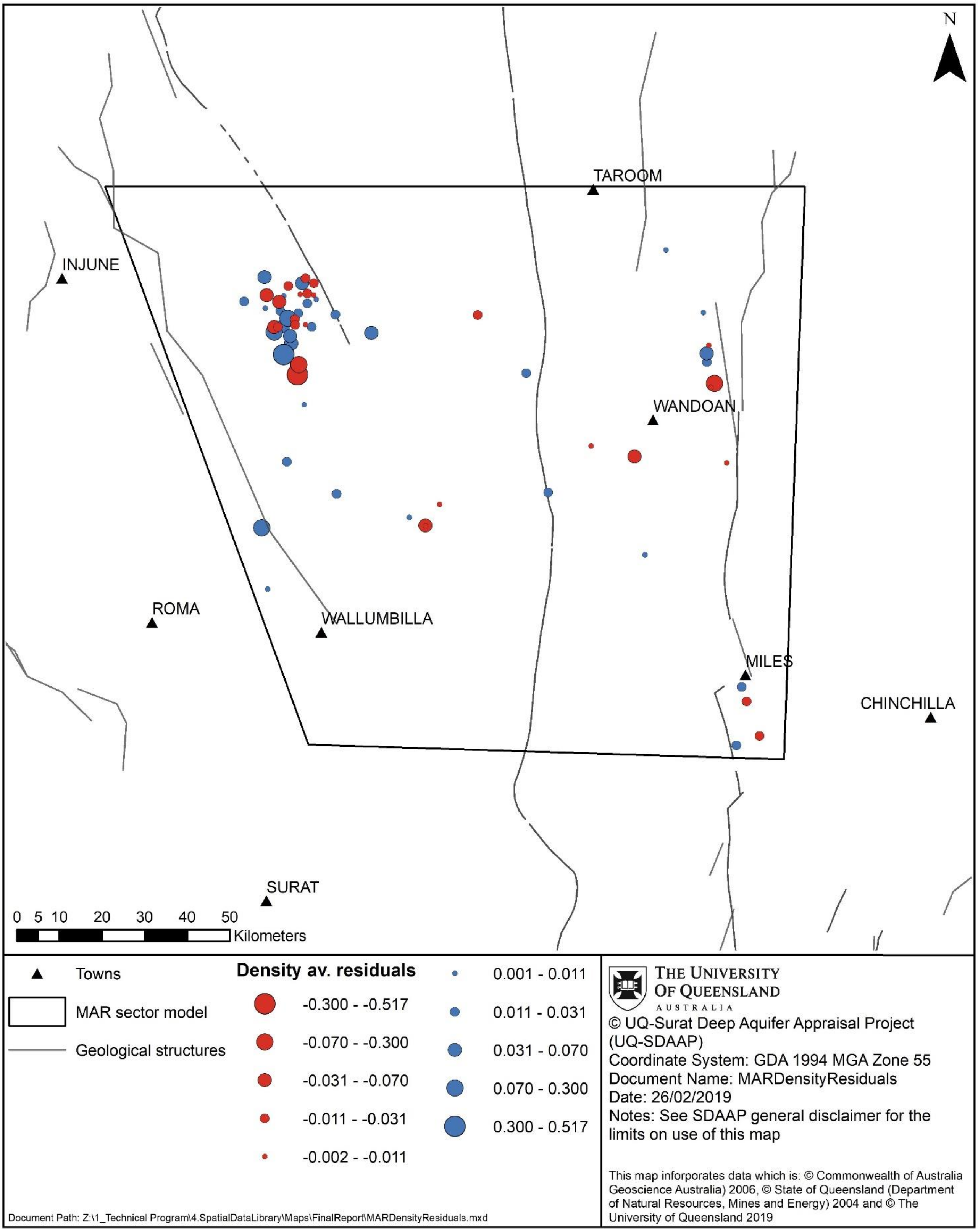
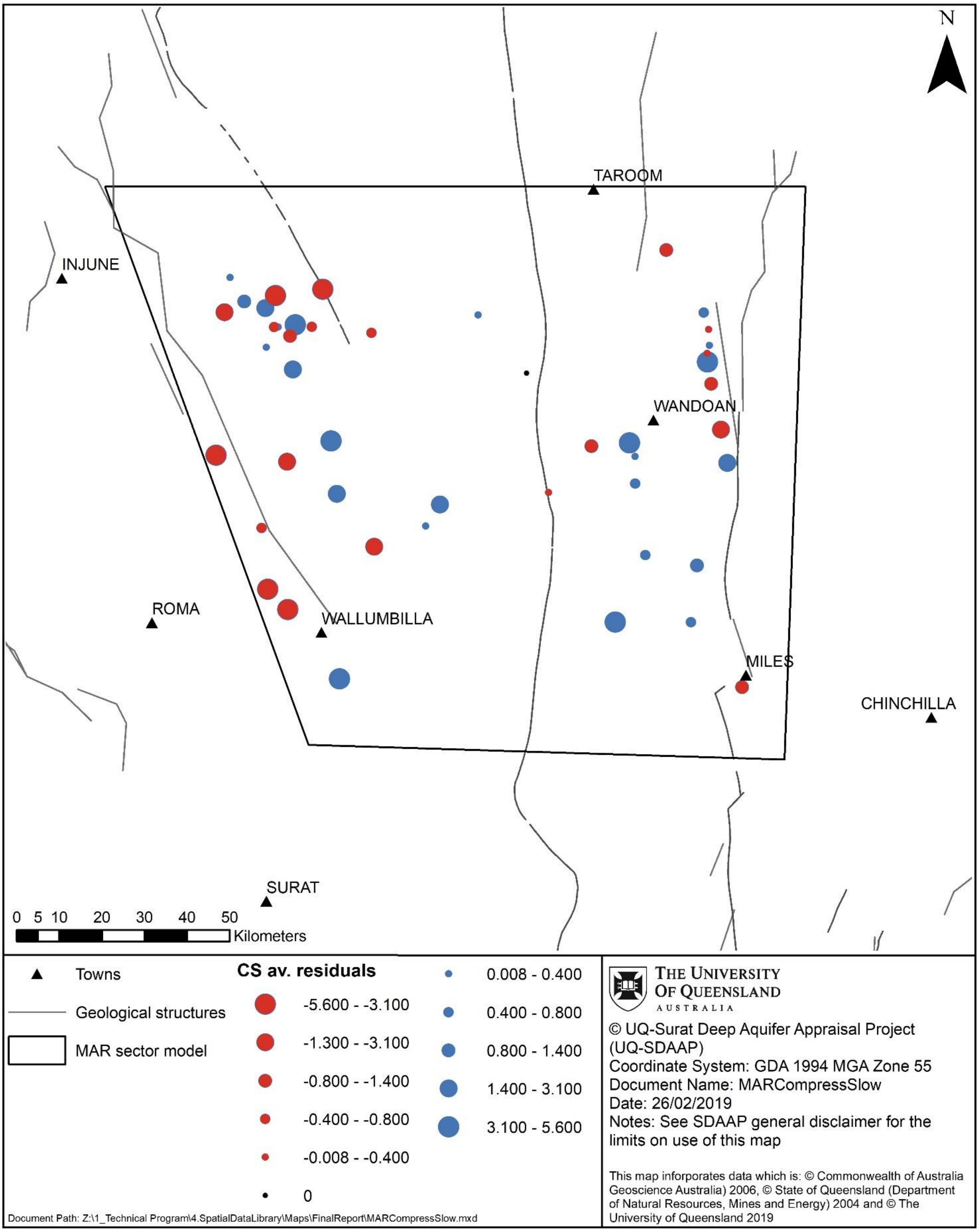


Figure 16   Residual map for the compressional slowness normalisation process.



7. Creation of flags

Coal (COAL) and Ironstone (IS_FL) flags were generated as follows:

- Ironstone: Density > 2.63 g/cc
- Coal flag: Using density log, flag if density < coal threshold, which varies slightly from well to well, usually less than 2.1 g/cc

8. Formation temperature and temperature gradient

The methodology usually used to estimate formation temperature in a model is 1) calculate static bottom hole temperature (SBHT) for most wells in the model from wireline logs using the methodology described by Fertl, Chilingarian & Yen 1986; 2) derive a temperature gradient using the SBHT calculated in the previous step; 3) use the temperature gradient to extrapolate temperatures at higher depths where we do not have calculated SBHT, as in the notional injection sector model of the UQ-SDAAP.

Calculating SBHT using Fertl, Chilingarian & Yen 1986 needs the knowledge of time since circulation and the recorded bottom hole temperature (BHT) for several wireline runs in every well. This data is used to plot a Horner plot. In many cases, such information is not available, and the process of calculating the static formation temperature using the above methodology would be time consuming for the UQ-SDAAP time constraints, thus we used a different approach to estimate formation temperature.

In UQ-DSAAP, we had 29 wells with open hole temperature logs recorded using a digital thermometer sonde (available in las format). We plotted the recorded temperature in the Blocky Sandstone Reservoir vs. depth (Figure 17), and created a best fit linear regression for each well, generating an equation with temperature gradient (the regression line gradient) and surface temperature (the y-axis intercept). Table 4 shows the temperature gradients and surface temperatures deduced from the temperature logs for the 29 wells (the green colour in Table 4 is explained in the paragraph below).

Table 4 Temperature gradients and surface temperatures derived from temperature logs in the Blocky Sandstone Reservoir. Data in green was used to calculate the average temperature gradient.

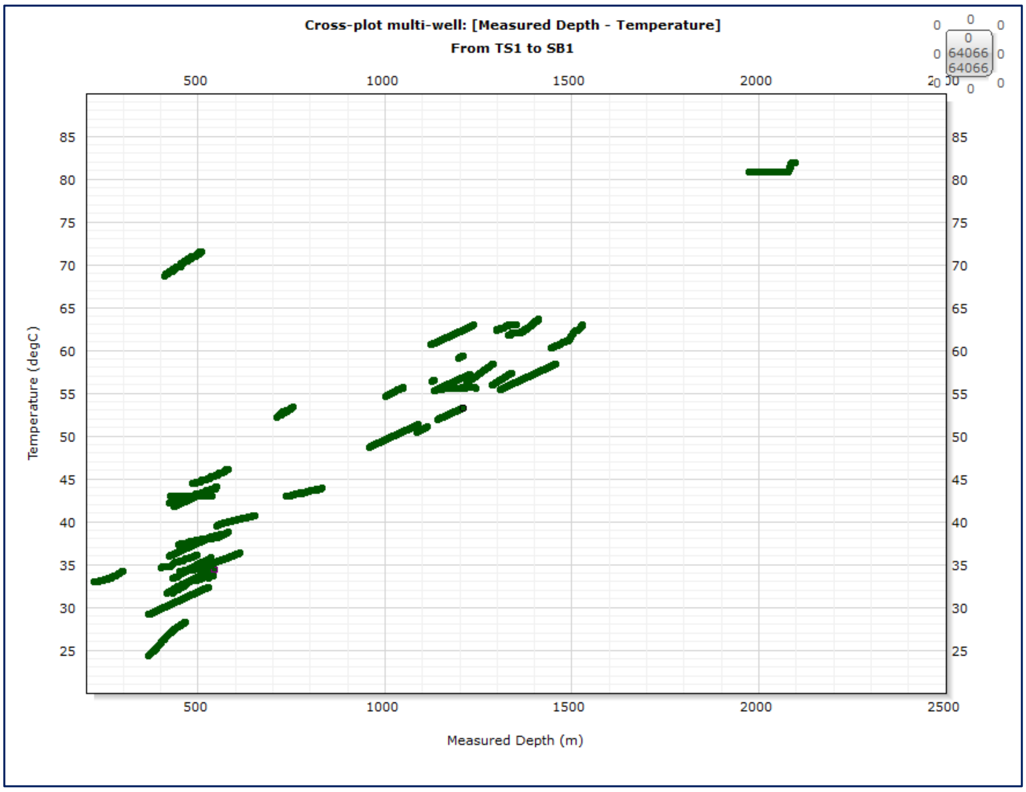
Well	Temperature gradient (ºC/100 m)	Surface temperature (ºC)
CONDABRI MB9-H	**2.34**	**26.5**
DURHAM RANCH 11	**1.81**	**28.4**
PINE HILLS 7	**2.96**	**24.9**
REEDY CREEK INJ2-P	**2.79**	**20.0**
SCOTIA 9	**1.82**	**25.2**
SLATEHILL 1	**3.55**	**26.9**
SPRING GULLY 41	**2.32**	**23.4**
SPRING GULLY 115	**2.11**	**22.9**
WOLEEBEE CREEK GW4	**2.56**	**24.2**
RIDGEWOOD 6	**2.56**	**22.0**
CHARLOTTE GW2	5.41	-1.30
COMBABULA 352 MON-P	2.09	33.8

CONDABRI 13	1.26	40.6
CONDABRI INJ2-P	1.53	36.0
COOCHIEMUDLO GW2	0.51	31.8
Durham Deep 1	1.32	38.2
DURHAM RANCH 12	1.24	37.0
DURHAM RANCH 59	2.60	58.2
PEAT 12	1.11	33.5
PEAT 15	1.23	33.8
REEDY CREEK INJ4-P	3.13	18.0
Reedy Creek MB3-H	2.07	35.3
SPRING GULLY 33	1.72	15.5
SPRING GULLY 36	2.84	12.2
SPRING GULLY 52	3.70	11.0
SPRING GULLY 53	5.48	9.2
SPRING GULLY 54	6.61	2.6
TASMANIA 1	1.11	60.9
WILLAROO 1	2.01	34.9
Average temp. gradient	**2.48**	

The surface temperature calculated from the regression line equation would vary due to the differences in the "time since circulation" for each well log etc. Since the average surface temperature is around 25ºC, we can reasonably assume that the wells for which regressions yielded surface temperatures between 20 and 30ºC have nearly reached their SBHT. Only 10 out of the 29 wells had regressions that yielded a surface temperature within that range (wells in green in Table 4). Thus, we calculated the average of the regression line temperature gradients of these wells to estimate the temperature gradient for Blocky Sandstone Reservoir. The average temperature gradient is 2.48 ºC/100 m.

The reference point used to extrapolate the temperature using the estimated temperature gradient was taken from the Moonie field model, provided by Bridgeport Energy (Rodger et al. 2019c).

Figure 17 Temperature depth cross-plots for different wells in the Blocky Sandstone Reservoir.



9. Calculating volume of shale (V_{shale})

There are several methods to calculate V_{shale}. Two methods we applied were:

1. Calculating V_{shale} from gamma ray
2. Calculating V_{shale} from neutron density

Usually, results from both methods should be similar. However, in the Transition Zone and Ultimate Seal, we had many discrepancies between the V_{shale} calculated from each method. Examples of such discrepancies are:

Ironstone beds have high density values, which results in relatively higher V_{shale} calculated form the neutron-density method than from the GR method. In Figure 18, V_{shale} from the neutron-density method is 0.5 v/v higher than V_{shale} from the GR method at the ironstone bed.

Some sand facies in the Transition Zone contain radioactive isotopes, and a higher concentration of feldspars, thus resulting in higher gamma ray measurements, and a relatively higher V_{shale} is calculated from GR methods (Pearce et al. 2019).

Figure 18 shows an example from the Moonie 40 well, where the gamma ray, neutron and density logs are displayed as well as the resultant calculated V_{shale} curves from the three logs. The V_{shale} curves are similar throughout the majority of the interval, yet, as shown in Figure 18, there is an interval or ironstone at the base of the Ultimate Seal where V_{shale} calculated from neutron–density is higher than V_{shale} calculated from gamma ray. Another interval exists at the bottom of the Transition Zone where V_{shale} calculated from gamma ray is greater than the V_{shale} calculated from neutron density.

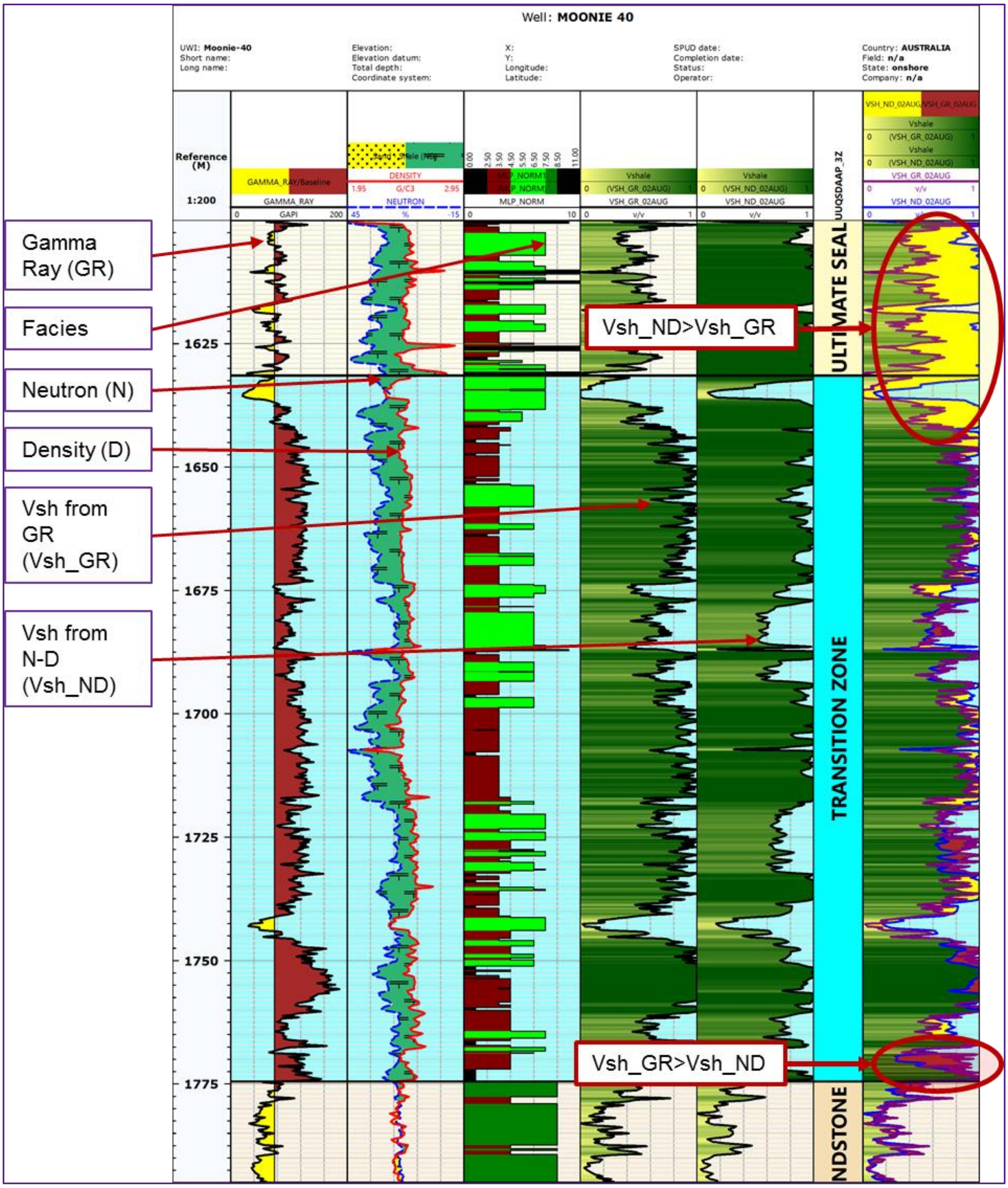
Normally, when V_{shale} is calculated using more than one method, the final V_{shale} value is considered the minimum of all methods, since most of the factors affecting V_{shale} tend to overestimate its value (for example radioactive sand will increase V_{shale} from gamma ray, heavy minerals will increase V_{shale} from neutron-density, etc.). However, in the UQ-SDAAP there are only 126 wells out of 285 where we could calculate Vsh from both methods. Having 126 wells with minimum V_{shale} and 159 wells with V_{shale} from gamma ray created a discrepancy for populating the static model, especially where wells in the same field had V_{shale} calculated using a mixture of methods.

For this reason, to avoid this discrepancy, we calculated V_{shale} in the UQ-SDAAP using gamma ray logs only. This means that intervals with radioactive sand (such as the bottom of the Transition Zone in the Moonie 41 well example above), will have overestimated V_{shale}. This will affect the SB and SC sand facies, which are mainly in the Transition Zone and happen to have higher radioactive isotope concentration than SA (see La Croix et al. 2019a and 2019c), as is evident from the available spectral gamma ray logs. To tackle this in the regional model, a V_{shale} based facies ($0.15 < V_{shale} < 0.35$) was assigned populated properties of sand in one scenario, and with populated properties of siltstone in another scenario (Gonzalez et al. 2019b).

The mnemonic of the UQ-SDAAP output V_{shale} curve is "**VSH**".

Table 9 in Appendix 2 (section 15.2) show the sand and shale parameters used to calculate V_{shale} for 285 wells.

Figure 18 *A log section from the Moonie 40 well showing gamma ray, neutron, density, facies V_{shale} calculated from gamma ray, V_{shale} calculated from neutron-density and both V_{shale} curves plotted on each other to show discrepancies.*



10. Calculating total and effective porosity

We calculated shale-corrected total and effective porosity using different methods, where applicable. We calculated V_{shale}, which we used to correct porosities for shale content from gamma ray as per section 9. The three methods we used to calculate porosities (whenever the logs that were required were available) were:

1. Porosity from neutron and density logs
2. Porosity from density logs
3. Porosity from compressional slowness logs

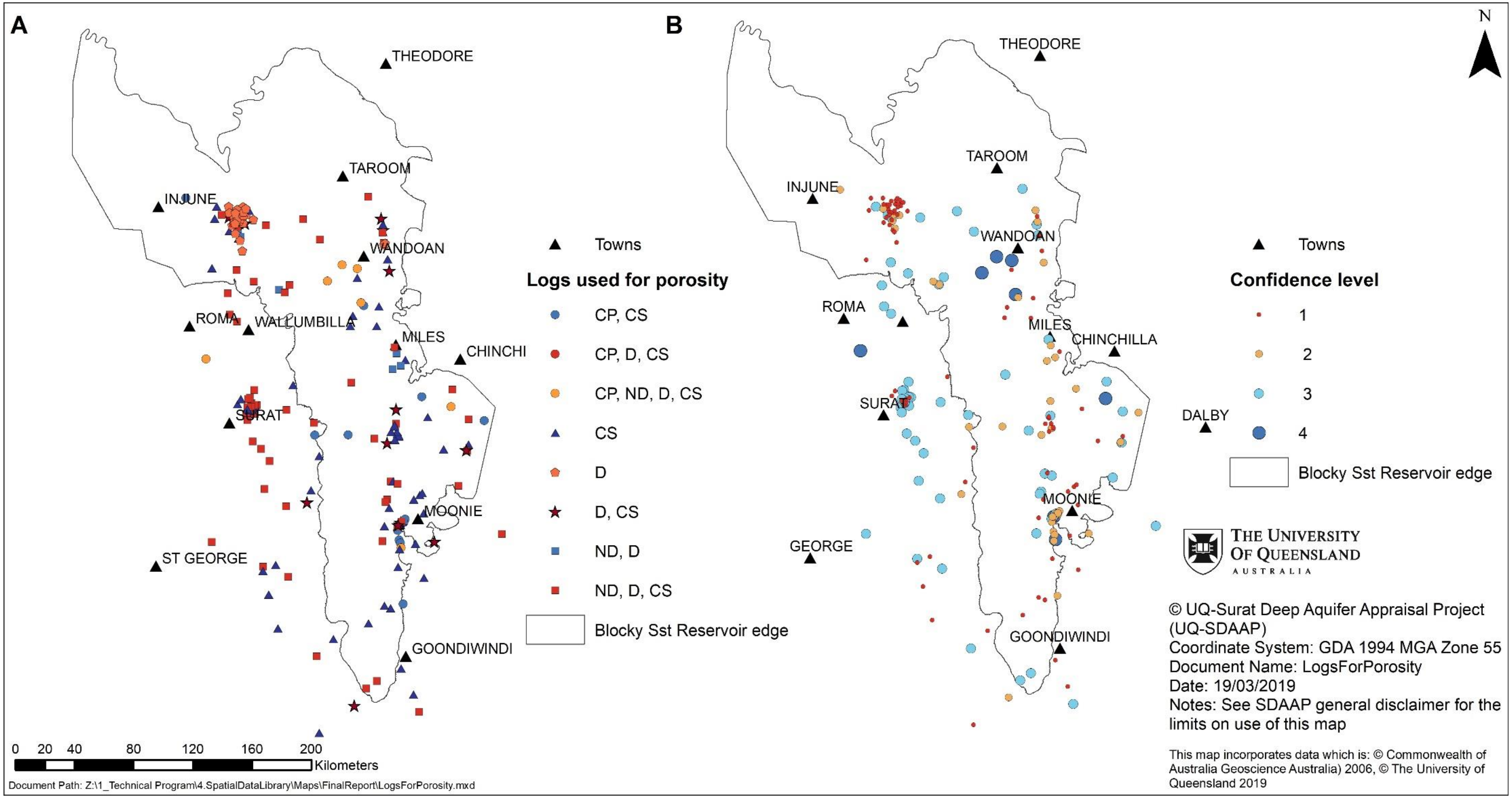
Whenever neutron and density logs were available, we considered the porosity from the neutron-density logs to be the most accurate, as using both measurements together can eliminate shale and gas effects. It was the primary method used for calculating porosity. If the neutron log was not available and the density log was, then we considered the porosity calculated from the density log to be the most accurate and used it as the primary method for porosity calculation. If both neutron and density logs were not available and only the compressional slowness log was available, then the porosity was calculated from compressional slowness data. The mnemonic for the *total* porosity output curve in the UQ-SDAAP project is “**PHIT**”, and the mnemonic for the *effective* porosity output curve in the UQ-SDAAP is “**PHIE**”.

When we calculated porosities using more than one method, we generally had lower uncertainty in the calculated data and more control over the shale parameters used for our calculations. Thus, we created a “confidence level” ranking to state if the wells’ porosity had been calculated using more than one method. We only used wells with a high confidence to generate histograms and produce the trends we used in the various static model parameterisation.

Table 10 in Appendix 3 (Section 15.3) lists the methods used to calculate total and effective porosity for each of the 208 wells, as well as their confidence level. Out of 208 wells, we calculated the porosity curves primarily from neutron-density for 79 wells, from density for 48 wells, and from compressional slowness for 81 wells. Out of the 208 wells, only 31 wells had core data where we could compare and correct our calculated porosities to match. Seventy-four out of 208 wells were calculated with high certainty (confidence level of three or four).

Figure 19 shows a map with the different logs available for calculating porosity, and another map showing the confidence level (certainty) of the calculated porosities. The confidence map shows that most of the wells in the SDPD have low confidence, as they were mostly calculated using only the compressional slowness.

Figure 19 (A) Map showing logs present for calculating porosities. (B) Map showing confidence levels of calculating porosity.



10.1 Porosity from neutron density

We calculated the total and effective porosity (PHIT and PHIE from the "Total Porosity and Saturation – Neutron Density" Quanti module in Techlog), whenever both neutron and density logs were available, and we considered the porosity calculated from this method to be the most reliable porosity curve when available.

Table 11 in Appendix 3 (Section 15.3) shows the parameters used for calculating porosity from neutron-density. As neutron and density logs are highly affected by wash outs and hole rugosity, we used the bad hole flag "BH_FLAG" to identify intervals with washouts and used the porosity from compressional slowness for these intervals instead.

10.2 Porosity from density

As an alternative to neutron-density, we calculated porosity form the density log using Equation 1, Equation 2 and Equation 3 below.

Equation 1

$$\rho_m = \rho_{SS} * (1 - VSH) + \rho_{sh} * VSH$$

Equation 2

$$PHITD = \frac{\rho_m - DENSITY}{\rho_m - \rho_{fl}}$$

Equation 3

$$PHIED = PHITD - VSH * PHISHALE$$

where ρ_m is the matrix density (g/cc), ρ_{SS} is the sandstone density (g/cc), V_{shale} is the volume of shale (v/v), ρ_{sh} is the dry shale density (g/cc), PHITD is the total porosity calculated from density log (v/v), DENSITY is the measured log bulk density (g/cc), ρ_{fl} is the fluid density (g/cc), PHIED is the effective porosity calculated from density log (v/v), and PHISHALE is the shale porosity (v/v).

Table 12 in Appendix 3 (Section 15.3) shows the parameters used for calculating porosity from density logs. Whenever the neutron log was not available, we considered the porosity calculated from density the next best option for a porosity curve, as it is generally higher confidence than the porosity calculated from compressional slowness. As density logs are highly affected by wash outs and hole rugosity, we used the bad hole flag "BH_FLAG" to identify such intervals and used the porosity from compressional slowness for these intervals instead.

We assigned a value of 1 g/cc for ρ_{fl}, since the fluid in the Blocky Sandstone Reservoir is mainly water (except in the Moonie field). We also assigned a value of 2.65 for ρ_{SS}, since the average grain density of the three main sand facies, SA, SB and SC is 2.65 =/- 0.01 g/cc (see Harfoush et al. 2019b; La Croix et al. 2019c). For shale parameters, we used various values as explained in section 10.4 below.

10.3 Porosity from sonic

We used the Wylie time averaged equation to calculate porosity from compressional slowness, correcting for shale, using Equation 4, Equation 5, Equation 6, Equation 7 and Equation 8 below.

Equation 4

$$PHITS = \frac{DT_{SC} - DT_{MATRIX}}{c_p * (DT_{FL} - DT_{MATRIX})}$$

Equation 5

$$DT_{SC} = SONIC - VSH * (DT_{SHALE} - DT_{C})$$

Equation 6

$$DT_{C} = PHISHALE * DT_{FL} + (1 - PHISHALE) * DT_{MATRIX}$$

Equation 7

$$DT_{SHALE} = PHISHALE * (DT_{FL} - DT_{DRY\ SHALE}) + DT_{DRY\ SHALE}$$

Equation 8

$$PHIES = PHITS * (1 - VSH)$$

Where PHITS is the total porosity calculated from compressional slowness (v/v), DT_{SC} is shale corrected compressional slowness (µs/ft), DT_{MATRIX} is the matrix compressional slowness (µs/ft), c_p is a compaction factor, DT_{FL} is the compressional slowness for fluid (µs/ft), SONIC is the logged compressional slowness (µs/ft), DT_{SHALE} is the compressional slowness of wet shale (µs/ft), DT_{C} is the compressional slowness corresponding to density porosity (µs/ft), PHISHALE is the shale porosity (v/v), $DT_{DRY\ SHALE}$ is the compressional slowness for dry shale (µs/ft), and PHIES is the effective porosity calculated from compressional slowness (v/v).

Three challenges were faced when we calculated porosity from sonic. These were:

1. Porosity calculated from compressional slowness is not sensitive to secondary porosity (fractures and vugs). When secondary porosity is present, there will be a discrepancy between porosity calculated from compressional slowness and the porosity calculated from density / neutron-density, and the porosity for wells with only compressional slowness will be underestimated. Since we wanted to estimate and model the total porosity (primary and secondary combined), we had to recalibrate the parameters either using other porosity curves (calculated from other methods), or core porosity measurements, and not the real matrix/shale values and compaction factors.
2. Sandstones have a wide range of matrix compressional slowness, from 50 to 55 µs/ft. This raises an uncertainty, when no data is available to support the choice of the matrix slowness, such as porosity calculated from another method or core data. In our case, when there was no supporting data, we used the parameters we assigned for the nearest well. We had to implement this for some wells in the SDPD, even though they were distant from each other. Although allocating the properties of the nearest well in this case is undesirable, it was the only option for obtaining a best estimate.
3. With the complex minerology in the UQ-SDAAP study area together with the variation of the clay content, it is difficult to match total porosities because we assume a constant matrix density when this is not necessarily a valid assumption. Thus, huge discrepancies appear between total porosity of the compressional slowness method vs. density/ neutron-density methods in the Transition Zone and the Ultimate Seal. However, effective porosity from different methods show a better match, and thus we used the effective porosity to populate the static model.

Table 13 in Appendix 3 (Section 15.3) shows the parameters used for calculating porosity from compressional slowness logs. Whenever neutron or density logs were not available, we considered the porosity calculated from compressional slowness the main porosity curve.

10.4 Identifying shale parameters

A major challenge and uncertainty in the UQ-SDAAP was the determination of shale parameters for the calculation of porosity (total and effective). There is no regional marine shale across the basin to establish baseline parameters from. In most wells, we couldn't find shale at all in the drill cutting descriptions or in the logs for the drilled section. Thus, we estimated the shale parameters on a case by case basis.

In the MARPD: we used the same shale parameters for all wells, because the logs were normalised, using the following methodology:

1. We used XRD data from the Woleebee Creek GW4 and West Wandoan 1 wells to calculate volume of clay that we converted to volume of shale as in section 6.1 above
2. We calculated V_{shale} from GR to match the results from XRD
3. We plotted a histogram of neutron, density and sonic data, filtered for values of V_{shale} higher than 0.95 v/v to get the wet properties of shale
4. From core plug data including a grain density measurement, we plotted core grain density vs V_{shale} to get a dry shale density
5. We used dry and wet shale density to calculate shale porosity
6. In the MCPD (on the western edge of the Blocky Sandstone Reservoir), the wireline logs included a shale section at the bottom of the logs, corresponding to the Moolayember Shale Member. We used that shale to identify the 'shale parameters'.

In the MPD, we had more certainty about the shale parameters due to:

– The presence of shale in the Transition Zone (usually separating the 56 and 58 sands)
– The presence of core plug data, thus we could adjust the parameters to match the core analysis data
– Some grain density measurements being measured on core plugs that we used to get the dry density to have a better estimate of shale porosity

For wells in SDPD, there is low confidence in the shale parameters due to:-

– the absence of shale sections in the logs,
– scarcity of core data,
– the distance between wells, and,
– the varying depths of the formations as the reservoir deepens towards the south.

Therefore, to estimate the shale parameters:

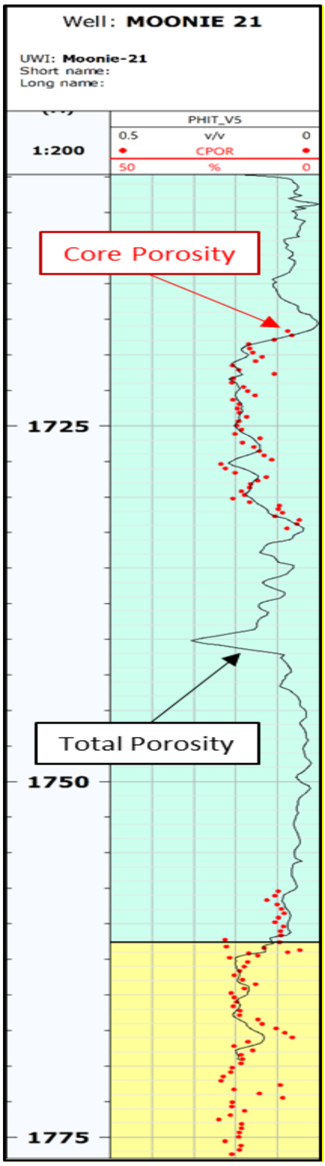
1. We used the MPD shale parameters as an estimate to calculate porosity for wells that had core data. We then calibrated the parameters until calculated total porosity matched the core data
2. We created a depth trend for shale parameters using the estimates we made in the cored wells
3. At every well we calculated the shale parameters from the depth trend

Note that since the shale we observed in the stratigraphic zones of interest is not regionally correlative, we had low confidence in the shale depth trend, as shales may be mineralogically different. However, because we lacked enough information to the contrary, these shales have been assumed to have the same depth trend.

10.5 Matching core data

Whenever core data was available, we considered the core data to be the most accurate porosity measurement. Thus, when we calculated the porosity from wireline logs, we always adjusted the parameters to match the total porosity with the measured core porosity. Figure 20 shows an example of what is considered to be a good match between measured core porosity and total porosity derived from petrophysics for the Moonie 21 well.

Figure 20 Log section showing calculated total porosity matched to measured core porosity for the Moonie 21 well



11. Calculating water saturation (Moonie field)

The Moonie field has been producing oil since 1964, with production mainly from the 58 Sand (which roughly corresponds to the Blocky Sandstone Reservoir with an upper portion being located in the basal part of the Transition Zone) and a smaller volume of production from the 56 sand (which corresponds to a section in the Transition Zone) - Figure 21. The current Moonie oil field production is now mainly a water cut with only a small portion being oil (Honari et al. 2019b). Because the field represents a multiphase system, we needed to estimate the water saturation for the petrophysical log analysis.

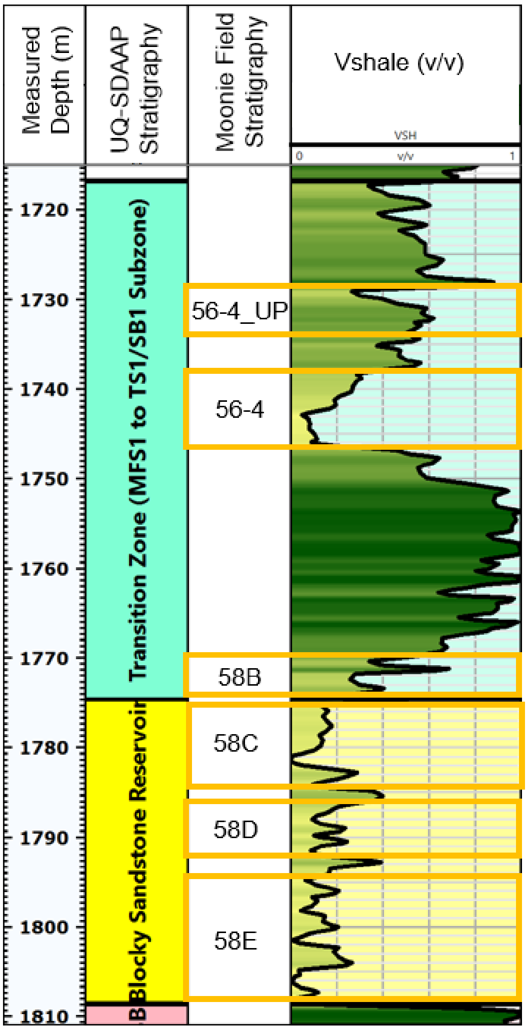
We calculated water saturation using the Archie Equation (Equation 9).

Equation 9

$$S_w = \left(\frac{a * R_w}{\emptyset^m * R_t}\right)^{1/n}$$

where S_w is water saturation (v/v), a is constant (usually equals 1), R_w is the formation water resistivity (ohm.m), φ is the porosity (v/v), R_t is the true formation resistivity (ohm.m), m is the cementation exponent, and n is the saturation exponent.

Figure 21 Log showing the Moonie 56 and 58 Sands with respect to UQ-SDAAP stratigraphic zones (The Moonie 23 well).



Bridgeport Energy Petrophysics Report (Bridgeport Energy 2016), shows that Rw measured from produced water is equivalent to ~1300 ppm NaCl salinity, which corresponds to an in-situ Rw value of 2.2 ohmm. At the time of interpretation, we assumed that the formation water chemistry in the Moonie Field is homogeneous. Thus, we fixed the salinity, and calculated the cementation exponent “m” for each well using a Pickett Plot of total porosity vs. deep resistivity, assuming a=1, n=1.8 (typical sandstone values) and R_w.=2.2 ohmm. Table 5 lists the values of the resultant cementation exponent “m”.

Table 5 The value of the cementation exponent m for the Pickett Plot with outlier values indicated in red text.

Well	m
MOONIE 16	1.6
MOONIE 21	Not clear
MOONIE 23	1.7
MOONIE 24	1.75
MOONIE 25	1.7
MOONIE 27	Not clear
MOONIE 28	1.6
MOONIE 31	1.6
MOONIE 33	Not clear
MOONIE 34	Not clear
MOONIE 36	1.65
MOONIE 37	1.75
MOONIE 38	1.7
MOONIE 39	1.55
MOONIE 40	1.75
MOONIE 41	1.7
MOONIE 42	1.625
MOONIE 43	**1.45**
MOONIE 44	**1.35**

Two wells that stood out of the range of values for m are Moonie 43 and Moonie 44, with m values of 1.45 and 1.35 respectively. We need to perform further research to identify the reason for this change. One possible reason is that due to production, the formation water around Moonie 43 and Moonie 44 wells was drawn from a more saline area of the aquifer and thus we should change the value of Rw and not m. Another reason would be that there are more fractures around the Moonie 43 and Moonie 44 wells. Ignoring the Moonie 43 and 44 well data, the average value of m for the remaining wells is 1.67.

We used the parameters derived above (a=1, m=1.67, n=1.8 and R_w=2.2 ohmm) to calculate water saturation, calling the resultant curve SW_AR. We also calculated another set of saturation curves called SW using the Archie Equation with typical Archie constants for sandstone (a=1, m=1.8, n=1.8 and Rw=2.2 ohmm).

A separate Masters student project (Mahlbacher 2019) examined the hydrochemistry of the Precipice Sandstone to Hutton Sandstone succession. They found evidence that the formation water salinity of the 56 Sand is higher than the 58 Sand and that there are also differences in the 56 Sand salinity between various Moonie wells where water chemistry was measured. Since our main aim for calculating water saturation in the UQ-SDAAP is to properly correct porosities for hydrocarbon, the uncertainty in water chemistry would not be expected to have a significant impact on our end-result of calculated porosities.

11.1 Hydrocarbon correction to porosity

In the case of the oil producing Moonie field (MPD), the calculated porosity was corrected for hydrocarbons, by changing the fluid density using the calculated water saturation, as per Equation 10 below:

Equation 10

$$\rho_f = \rho_w * S_w + \rho_{HC} * (1 - S_w)$$

Where ρ_f is the fluid density, ρ_w is the density of water (1 g/cc), Sw is the calculated water saturation, and ρ_{HC} is the hydrocarbon density (Table 6) at reservoir conditions.

Table 6 shows the oil parameters used to calculate the hydrocarbon density in the reservoir. Well test results showed that the oil is 44 API, while the value of Bo was extracted from the Bridgeport Energy Moonie field dynamic reservoir model.

Table 6 Density of hydrocarbons in the Moonie field at reservoir conditions.

API	SG	Bo	SG at reservoir depth
44	0.806	1.16	0.695

The new calculated porosity is fed back to the water saturation equation to recalculate water saturation, which was used to recalculate fluid density and hence porosity. The process is iterated until the error between the consecutive results is minimised.

12. Calculating permeability

We calculated permeability for a total of 73 wells in UQ-SDAAP using log facies (MLP_NORM), volume of shale (V_{shale}) and total porosity (PHIT). We used one of four different permeability scenarios designed to reproduce the permeability measured on core data analysis and from DST analysis. We called the permeability curves PERM. The methodology of creating the permeability models and which permeability scenarios were assigned to different wells are described in detail in Harfoush et al. (2019d).

13. Summary of petrophysical results

Using the methodology described from section 1.1.3 to section 1.1.10 in this chapter, we were able to calculate volume of shale for 285 wells, total porosity and effective porosity for 208 wells and permeability for 73 wells. A summary of the results of the wireline log analysis for UQ-SDAAP is presented in Table 14 in Appendix 4 (section 15.4), where we list the arithmetic means of V_{shale}, PHIT, PHIE and PERM for each UQ-SDAAP zone and subzone (Ultimate Seal, SB2 to TS3, MFS1 to SB2, J10/TS1 to MFS1 and the Blocky Sandstone Reservoir).

We then analysed the output petrophysical properties to characterise the zones of interest for the UQ-SDAAP geographically, via creation of maps plotting the arithmetic means of V_{shale}, PHIT, PHIE and PERM for each of the UQ-SDAAP zones and subzones (Figure 29 to Figure 43 in Appendix 4, section 15.4).

Another tool of analysis we used to characterise the vertical variation of the petrophysical outputs across the different UQ-SDAAP stratigraphic zones is a cross section panel (Figure 22). Figure 22 shows a cross section panel with calculated petrophysical properties from different wells, arranged from north to south along the basin axis, using the wells Trelinga 1, Woleebee Creek GW4, Tasmania 1, Forkes Creek 1, Moonie 33, and Willaroo 1.

The UQ-SDAAP zones are marked and colour coded, and the wells use the top of the Ultimate Seal as a datum. For each well we display the following logs:

- Track 1 (left): Depth
- Track 2: Facies (MLP_NORM). Dark green colour refers to facies SA, green refers to facies SB, SC and SD, and maroon colour refers to the remaining facies (La Croix et al. 2019c)
- Track 3: Volume of shale (V_{shale})
- Track 4: Total porosity (PHIT), effective porosity (PHIE) and core porosity (CPOR, if present);
- Track 5: Calculated log permeability (PERM) and core water in-situ reservoir permeability (KHCOR, if present)
- Track 6: High density flag (IS_FL). In the Ultimate Seal this flag is used to predict ironstone, thus was called the ironstone flag. However, we also used it to detect places where density is reading higher than 2.63 g/cc due to mineralogy such as calcite cements, etc. in the Transition Zone
- Track 7: UQ-SDAAP zones, where the topmost (beige shading) zone is the Ultimate Seal, followed by the three subzones of the Transition Zone - SB2 to TS3 (light blue), MFS1 to SB2 (orange) and J10/TS1 to MFS1 (green, equivalent to Upper Precipice). The deepest zone in Track 7 is the Blocky Sandstone Reservoir (yellow)
- Table 7 shows the arithmetic means of petrophysical properties for wells presented in Figure 22.

In subsections 13.1 to 13.5 below, we have characterised the UQ-SDAAP zones and subzones in light of the maps and cross section panel we have mentioned in this page.

Figure 22 *Cross section showing the calculated petrophysical properties across the basin, showing results for the Trelinga 1 (North), Woleebee Creek GW4, Tasmania 1, Forkes Creek 1, Moonie 33, Willaroo 1 (South) wells, and a map showing the location of the wells.*

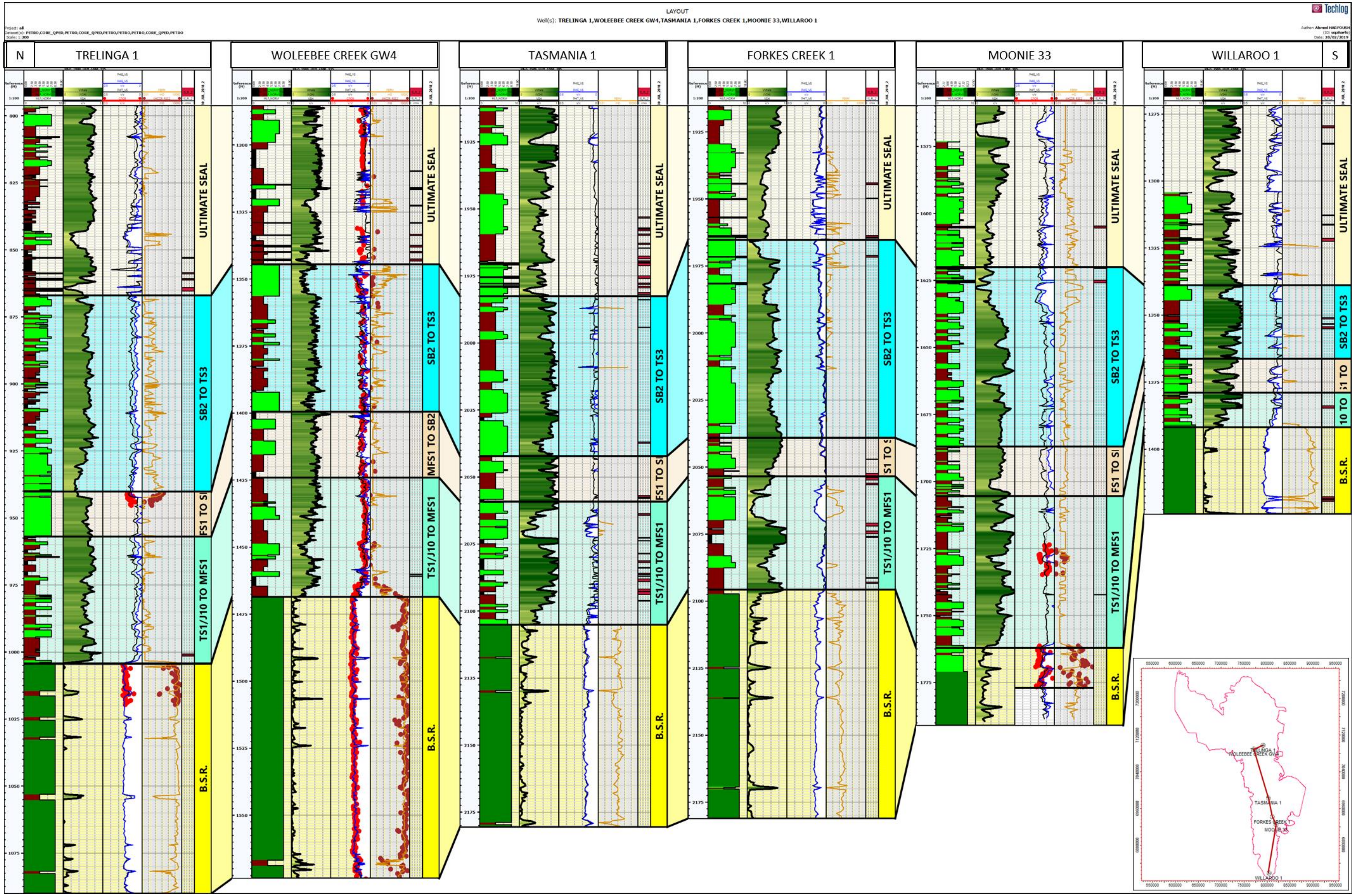


Table 7 Arithmetic means of petrophysical properties for wells presented in Figure 22.

		Trelinga 1	Woleebee Creek GW4	Tasmania 1	Forkes Creek 1	Moonie 33	Willaroo 1
V_{shale} (v/v)	Ultimate Seal	0.630	0.595	0.628	0.561	0.465	0.609
	SB2 to TS3	0.586	0.534	0.759	0.612	0.588	0.781
	MFS1 to SB2	0.603	0.622	0.855	0.726	0.621	0.637
	J10/TS1 to MFS1	0.632	0.515	0.652	0.539	0.688	0.613
	Blocky Sandstone Reservoir	0.033	0.066	0.102	0.116	0.252	0.058
Φ_T (v/v)	Ultimate Seal	0.097	0.069	0.044	0.096	0.149	0.105
	SB2 to TS3	0.130	0.118	0.061	0.070	0.135	0.090
	MFS1 to SB2	0.080	0.124	0.057	0.036	0.138	0.106
	J10/TS1 to MFS1	0.098	0.088	0.077	0.057	0.102	0.112
	Blocky Sandstone Reservoir	0.220	0.199	0.163	0.126	0.141	0.205
Φ_E (v/v)	Ultimate Seal	0.045	0.022	0.005	0.086	0.086	0.060
	SB2 to TS3	0.078	0.071	0.012	0.059	0.057	0.033
	MFS1 to SB2	0.026	0.070	0.003	0.023	0.051	0.055
	J10/TS1 to MFS1	0.041	0.042	0.039	0.048	0.008	0.068
	Blocky Sandstone Reservoir	0.217	0.193	0.156	0.124	0.108	0.201
Perm (mD)	Ultimate Seal	1.055	1.704	0.000	0.252	3.474	6.076
	SB2 to TS3	0.926	7.458	2.955	0.273	8.359	0.196
	MFS1 to SB2	1.021	0.106	0.000	0.003	0.547	0.085
	J10/TS1 to MFS1	17.84	1.991	0.189	0.306	0.412	0.525
	Blocky Sandstone Reservoir	1964	1987	16.49	2.110	35.93	355.3

13.1 Wireline log interpretation for the Blocky Sandstone Reservoir

Figure 29 to Figure 31 show maps of V_{shale}, effective porosity, and permeability for the Blocky Sandstone Reservoir.

The Blocky Sandstone Reservoir consists of clean sandstone in general, with low V_{shale} values ranging from 0.005 v/v to 0.398 v/v. The northern part of the Blocky Sandstone Reservoir (MARPD) generally exhibits low V_{shale} values (cleaner sandstones), except for the Spring Gully/Durham Ranch area, which has an average 0.148 v/v. Further south (SDPD and MPD), V_{shale} increases and is more heterogeneous. V_{shale} tends to be greater where the Blocky Sandstone Reservoir is thin. We are uncertain about the V_{shale} values in the centre of the basin (notional injection site sector model) due to a lack of data, however, we interpret it to follow the same V_{shale} -thickness trend observed in the rest of the basin.

Effective porosity (Φ_E) in the Blocky Sandstone Reservoir ranges from 0.093 v/v to 0.234 v/v. Φ_E values are higher at shallower parts of the reservoir and decrease with depth. Porosity also tends to be lower at the south eastern edge of the reservoir where the V_{shale} values are higher.

The arithmetic mean of permeability (refer to Harfoush et al. 2019d) ranges from 4.7 mD to 3943 mD, with the northern part of the reservoir (MARPD) exhibiting much higher permeability than the southern region (SDPD). The Moonie field (MPD) exhibits medium permeability (average 114 mD). Since permeability is dependent on porosity, values also tend to decrease towards deeper parts of the reservoir with deeper burial.

From the cross section panel (Figure 22), we can also notice that the northern wells have clean sands with streaks of muddy sandstone (facies SMA) laminae across the thickness of the Blocky Sandstone Reservoir. In the south, the clays tend to become more interstitial and mixed within the sandstone matrix reducing the permeability.

13.2 Wireline log interpretation for the Transition Zone – TS1/J10 to MFS1 subzone

Figure 32 to Figure 34 show maps of V_{shale}, effective porosity and permeability in the Transition Zone (TS1/J10 to MFS1 subzone), respectively.

V_{shale} in this subzone exhibits heterogeneity, with V_{shale} values ranging from 0.162 to 0.908 v/v and average V_{shale} of 0.558 v/v.

Effective porosity values are relatively lower than the Blocky Sandstone Reservoir, ranging from 0.002 v/v to 0.154 v/v with arithmetic mean of 0.061 v/v. Porosities in the Spring Gully/Durham Ranch area seem to be heterogenous with values as high as 0.12 v/v and low as 0.02 v/v. The Myall Creek area (MCPD) shows effective porosity at the higher end of the spectrum (0.08 – 0.12 v/v), the Moonie Field (MPD) has porosities relatively lower than the Myall Creek area (~0.06 v/v), while wells in the east of the basin (eastern flank of SDPD) exhibit the lowest effective porosity.

Permeability in the Transition Zone (TS1/J10 to MFS1 subzone) varies greatly from less than 0.01 mD to 1060 mD with an arithmetic mean of 72.4 mD. Permeabilities are relatively higher at the edges of the MARPD, reducing towards the centre of the basin (SDPD) (around two orders of magnitude), and tend to be lowest at the centre of the basin (all the way east to west), and the south of the basin (SDPD). This corroborates the depositional environment interpretations of La Croix et al. 2019c. Exceptions in the southern part of the basin are the Moonie Field (MPD) where permeability is around 10 to 15 mD, and some wells in the Leichhardt Fault area (like Bennett 1) where permeabilities are higher than 100 mD (as well as wells with low permeability, demonstrating heterogeneity in the Leichhardt Fault area).

From the cross section panel (Figure 22), we can note that towards the south, the TS1/J10 to MFS1 subzone starts developing patches of lower V_{shale} values corresponding to the SB sand facies. We can also notice that wells in the basin centre tend to have laminae flagged to be "high density" that cutting description reports describe as calcite cements.

13.3 Wireline log interpretation for Transition Zone – MFS1 to SB2 subzone

Figure 35 to Figure 37 show maps of V_{shale}, effective porosity and permeability in the Transition Zone (MFS1 to SB2 subzone), respectively.

V_{shale} in this subzone exhibit heterogeneity, with V_{shale} values ranging from 0.264 to 0.935 v/v and an average V_{shale} of 0.667 v/v. The Spring Gully Durham Ranch Area however, demonstrates higher values of V_{shale} than the wells in the rest of the basin.

Effective porosity in the Transition Zone (MFS1 to SB2 subzone) varies from 0.001 to 0.146 v/v with a mean of 0.048 v/v. Wells in the east of the MARPD, MCPD, east of the SDPD basin and MPD tend to have high values of porosity, while the Spring Gully/Durham Ranch area and the centre of the SDPD tend to show low effective porosities.

Permeability in the Transition Zone (MFS1 to SB2 subzone) is mainly very low (less than 0.01 mD), but with some wells having averages up to 247 mD. The high mean values in some wells come from the logarithmic nature of permeability, since a streak of sand with relatively high permeability would bias the average towards the high value.

From the cross section panel (Figure 22), we can note that there is also facies heterogeneity. Some wells have a higher content of sand facies than others (hot sands – electro-facies predicted from neural networks (La Croix et al. 2019c) is sandstone, core pictures (if available) exhibit sandstone, but V_{shale} from gamma ray is high), yet we do not have a geological or areal trend for how these sands are distributed.

13.4 Wireline log interpretation for the Transition Zone – SB2 to TS3 subzone

Figure 38 to Figure 40 show maps of V_{shale}, effective porosity and permeability in the Transition Zone (SB2 to TS3 subzone), respectively.

V_{shale} in this subzone exhibits heterogeneity, with V_{shale} values ranging from 0.238 to 0.947 v/v and an average V_{shale} of 0.614 v/v. The Spring Gully Durham Ranch area however, demonstrates higher values of V_{shale} than the wells in the rest of the basin, while in the west towards the Roma Shelf and Wunger Ridge (west of the Blocky Sandstone Reservoir zero edge), the values of V_{shale} tend to be lower than the rest of the basin.

Effective porosity in the Transition Zone (SB2 to TS3 subzone) varies from less than 0.01v/v to 0.135 v/v with an average of 0.059 v/v. The highest values are in the MCPD and the MPD, with values tending to reduce as the formation becomes deeper. An exception is in the Spring Gully/Durham Ranch area, were the effective porosities are generally low.

Permeability ranges from less than 0.01 mD to 1009 mD. With the exception of the MPD, the Leichhardt Fault Area and some wells in the MARPD (where the Boxvale Sand is present), the permeability values are generally low.

From the cross section panel (Figure 22), we notice that more sands develop towards the south and the edges of the basin. We can also see areas of high permeability (from 10 to 100 mD) at the top section of the subzone, corresponding to the Boxvale Sandstone in some wells (Woleebee Creek GW4 and Moonie 33), yet there seems to be no trend for the occurrence of such relatively high permeability sections.

13.5 Wireline log interpretation for the Ultimate Seal

The effectiveness of the Ultimate Seal relies on the presence of the ironstone bed that is abundant across the basin (La Croix et al. 2019a and 2019b). These ironstone beds in the Ultimate Seal are flagged in the cross section panel (Figure 22) in Track 6, which displays the “high density” flag.

Figure 41 to Figure 43 show maps of V_{shale}, effective porosity and permeability in the Ultimate Seal, respectively.

V_{shale} in this zone exhibits heterogeneity, with V_{shale} values ranging from 0.256 to 0.886 v/v with an average V_{shale} of 0.571 v/v. The Spring Gully Durham Ranch area however, demonstrates higher values of V_{shale} than the wells in the rest of the basin, while wells in the central east (MPD and East of the SDPD) have values of V_{shale} that tend to be lower than the rest of the basin.

Effective porosity ranges from less than 0.01 v/v to 0.198 v/v with an arithmetic mean of 0.066 v/v. It is mainly low in the north and is higher on both sides of the basin in the south. We do not have enough data in the south central area of the basin (SDPD) to predict if the effective porosity is lower or similar to the values on the sides of the basin.

Permeability ranges from less than 0.01 mD to 1391 mD with an average of 104.5 mD. The value is higher than expected due to the sandy sections above the ironstone beds. The Myall Creek area permeability is low. We are uncertain about the likelihood of such sand patches with high permeability above the ironstone in the centre of the basin.

From the cross section panel (Figure 22), we do not always see the patchy sand sections in the Ultimate Seal.

14. References

Bridgeport Energy (2016), *Petrophysical Model of the Moonie Oil Field*.
Aly AM et al. (1997), Application of Multi-Well Normalization of Open Hole Logs in Integrated Reservoir Studies, SPE Western Regional Meeting, Long Beach, California: Society of Petroleum Engineers, pp 7, doi: 10.2118/38263-MS.

Bornemann E & Doveton JH (1981), Log Normalization By Trend Surface Analysis, *The Log Analyst*, Society of Petrophysicists and Well-Log Analysts, vol 22(04), pp 7.

Fertl WH, Chilingarian GV & Yen TF (1986), Determination of True Static Formation Temperature from Well Logs, *Energy Sources*, vol 8(2), pp 277–288.

Gonzalez S, Harfoush A, La Croix A, Underschultz J & Garnett A (2019*), Regional static model*, The University of Queensland Surat Deep Aquifer Appraisal Project – Supplementary Detailed Report, The University of Queensland.

Harfoush A, Pearce J & Wolhuter A (2019), *Core data analysis*, The University of Queensland Surat Deep Aquifer Appraisal Project – Supplementary Detailed Report, The University of Queensland.

Harfoush A, Gonzalez S, Ribeiro A & Wolhuter A (2019), *Fluid substitution for seismic detection of plume*, The University of Queensland Surat Deep Aquifer Appraisal Project – Supplementary Detailed Report, The University of Queensland.

Honari V, Gonzalez S, Underschultz J & Garnett A (2019*), Moonie oil field history match and re-evaluation*, The University of Queensland Surat Deep Aquifer Appraisal Project – Supplementary Detailed Report, The University of Queensland.

Knox CC & Neinast GS (1974), Normalization Of Well Log Digitizing, *The Log Analyst*, Society of Petrophysicists and Well-Log Analysts, vol 15(02), pp 25.

La Croix A, Wang J & Underschultz J (2019*), Integrated facies analysis of the Precipice Sandstone and Evergreen Formation in the Surat Basin*, The University of Queensland Surat Deep Aquifer Appraisal Project – Supplementary Detailed Report, The University of Queensland.

La Croix A, He J, Wang J & Underschultz J (2019), *Facies prediction from well logs in the Precipice Sandstone and Evergreen Formation in the Surat Basin*, The University of Queensland Surat Deep Aquifer Appraisal Project – Supplementary Detailed Report, The University of Queensland.

La Croix A, Hannaford C & Underschultz J (2019), *Palynological analysis of the Precipice Sandstone and Evergreen Formation in the Surat Basin*, The University of Queensland Surat Deep Aquifer Appraisal Project – Supplementary Detailed Report, The University of Queensland.

Mahlbacher A (2019), Hydrogeochemical investigation of the Precipice Sandstone aquifer in the Moonie Area, Southern Surat Basin, Australia: Assessing up-fault discharge potential, Masters of Science Thesis, The University of Queensland Surat Deep Aquifer Appraisal Project – Supplementary Detailed Report, The University of Queensland.

Pearce J, Underschultz J & La Croix A (2019), *Mineralogy, geochemical CO2-water-rock reactions and associated characterisation*, The University of Queensland Surat Deep Aquifer Appraisal Project – Supplementary Detailed Report, The University of Queensland.

Ren B et al. (2014), A Novel Workflow of Density Log Normalisation for Coalbed Methane Wells: An Example From the Surat Basin in Australia, SPE Asia Pacific Oil & Gas Conference and Exhibition, Adelaide, Australia: Society of Petroleum Engineers, pp 11. doi: 10.2118/171417-MS.

Rodger I, La Croix A, Underschultz J & Garnett A (2019*), Transition Zone behaviour test models*, The University of Queensland Surat Deep Aquifer Appraisal Project – Supplementary Detailed Report, The University of Queensland.

Shier DE (2004), Well Log Normalization: Methods and Guidelines', *Petrophysics*, Society of Petrophysicists and Well-Log Analysts, vol 45(03), pp 13.

15. Appendices

15.1 Appendix 1: Wireline inventory table and maps

Table 8 Table showing wells used for log analysis and interpretation. The table includes well name, database, logging curves available, and the petrophysical properties calculated for each well. Y: available, N: normalised, -: not available, B: available but poor quality.

Well Name	Database	GAMMA_RAY	NEUTRON	DENSITY	PDPE	SONIC	Resistivity	V_{shale}	φ_T and φ_E	Permeability	Comments
ALICK CREEK 1	SDPD	Y	-	-	-	Y	Y	Y	Y	-	
ALTON SOUTH 1	SDPD	Y	-	-	-	Y	Y	Y	Y	-	
AMOOLEE 1	MARPD	N	-	-	-	N	Y	Y	Y	-	
ARLINGTON 1	SDPD	Y	-	Y	-	Y	Y	Y	Y	-	
AUBURN 1	MARPD	N	-	-	-	N	Y	Y	Y	-	
AVONDALE 4	V_{shale}	Y	Y	Y	-	Y	Y	Y	-	-	
BAINBILLA 2	MCPD	Y	-	-	-	Y	Y	Y	Y	-	
BALLAROO 1	V_{shale}	Y	Y	Y	-	Y	Y	Y	-	-	
BALLYMENA 1	SDPD	Y	Y	-	-	Y	-	Y	Y	-	
BEAUFORT 6	V_{shale}	Y	Y	Y	-	Y	Y	Y	-	-	
BELBRI 2	V_{shale}	Y	Y	Y	-	Y	Y	Y	-	-	
BENGALLA 1	MARPD	N	-	-	-	N	Y	Y	-	-	
BENNETT 1	SDPD	Y	-	-	-	Y	Y	Y	Y	-	
BENNETT 2	SDPD	Y	-	-	-	Y	Y	Y	Y	-	
BENNETT 4	SDPD	Y	Y	-	-	Y	Y	Y	Y	-	
BENNETT NORTH 1	SDPD	Y	-	-	-	Y	Y	Y	Y	-	
BENTLEY 1	SDPD	Y	-	Y	-	Y	Y	Y	Y	-	
BILBY 1	V_{shale}	Y	Y	Y	-	Y	Y	Y	-	-	
BOOBERANNA 1	SDPD	Y	-	-	-	Y	-	Y	Y	-	
BOOKOOI 1	MCPD	Y	Y	Y	-	Y	Y	Y	Y	-	
BOOROONDOO 1	SDPD	-	-	-	-	Y	Y	Y	Y	-	
BRAEMAR 1	SDPD	Y	-	-	-	Y	Y	Y	Y	-	
BRIGALOW CREEK 1	SDPD	Y	-	-	-	Y	-	Y	Y	-	
BULWER 1	MARPD	Y	-	-	-	Y	Y	Y	Y	Y	
BUNGARIE 1	SDPD	B	-	-	-	Y	Y	-	-	-	

Well Name	Database	GAMMA_RAY	NEUTRON	DENSITY	PDPE	SONIC	Resistivity	V_{shale}	φ_T and φ_E	Permeability	Comments
BUNGUNYA 1	SDPD	Y	Y	Y	Y	Y	-	Y	Y	Y	
BURGOYNE 1	MARPD	N	N	N	-	N	Y	Y	Y	Y	
BURUNGA 1	MARPD	-	-	-	-	N	Y	-	-	-	
CABAWIN 1	V_{shale}	Y	Y	-	-	-	-	Y	-	-	
CABAWIN 3	SDPD	Y	Y	Y	-	Y	Y	Y	Y	Y	
CABAWIN 4	SDPD	Y	-	-	-	Y	-	Y	Y	-	
CABAWIN EAST 1	SDPD	-	-	-	-	Y	Y	-	-	-	
CANEON 1	MARPD	N	N	N	-	N	Y	Y	Y	Y	
CARDIGAN 1	V_{shale}	Y	Y	Y	Y	Y	Y	Y	-	-	
CERULEAN 2	V_{shale}	Y	Y	Y	Y	Y	Y	Y	-	-	
CHANTARA 1	V_{shale}	Y	Y	Y	Y	Y	Y	Y	-	-	
CHARLIE GW2	MARPD	N	N	N	Y	N	Y	Y	Y	Y	
CHARLOTTE GW2	MARPD	N	N	N	Y	N	Y	Y	Y	Y	
CHESTER 1	SDPD	Y	-	Y	-	Y	Y	Y	Y	-	
CHINCHILLA 4	MARPD	N	-	-	-	-	Y	Y	-	-	
CHURCHIE 1	MCPD	Y	-	-	-	Y	Y	Y	Y	-	
CHURCHIE 11	MCPD	Y	Y	Y	Y	Y	Y	Y	Y	-	
CHURCHIE 1A	MCPD	Y	Y	Y	Y	Y	Y	Y	Y	Y	
CHURCHIE 2	MCPD	Y	-	-	-	Y	Y	Y	Y	-	
CHURCHIE 3	MCPD	Y	Y	Y	Y	Y	Y	Y	Y	Y	
CHURCHIE 4	MCPD	Y	-	-	-	Y	Y	Y	Y	-	
CHURCHIE 5	MCPD	Y	Y	Y	Y	Y	Y	Y	Y	Y	
CHURCHIE 6	MCPD	Y	Y	Y	Y	Y	Y	Y	Y	-	
CHURCHIE 7	MCPD	Y	Y	Y	Y	Y	Y	Y	Y	-	
CHURCHIE WEST 1	MCPD	Y	Y	Y	Y	Y	Y	Y	Y	-	
COALBAH 1	SDPD	Y	-	-	-	N	Y	Y	Y	-	
COBALT 1	V_{shale}	Y	Y	Y	Y	Y	Y	Y	-	-	
COMBABULA 352 MON-P	MARPD	N	N	N	Y	N	Y	Y	Y	Y	
CONDABRI 13	MARPD	N	N	N	Y	-	Y	Y	Y	Y	
CONDABRI INJ2-P	MARPD	N	N	N	Y	-	Y	Y	Y	Y	

Well Name	Database	GAMMA_RAY	NEUTRON	DENSITY	PDPE	SONIC	Resistivity	V_{shale}	φ_T and φ_E	Permeability	Comments
CONDABRI MB9-H	MARPD	N	N	N	Y	-	Y	Y	Y	Y	
CONLOI 1	SDPD	Y	-	-	-	Y	-	Y	Y	-	
CONN CREEK 1	V_{shale}	Y	Y	Y	-	Y	Y	Y	-	-	
COOCHIEMUDLO GW2	MARPD	N	N	N	Y	N	Y	Y	Y	Y	
COXON CREEK 1	V_{shale}	Y	Y	Y	-	Y	Y	Y	-	-	
CROSSMAGLEN 1	V_{shale}	Y	Y	Y	-	Y	Y	Y	-	-	
CROWDER NORTH 1	SDPD	Y	-	-	-	Y	Y	Y	Y	-	
DAVIDSON 1	SDPD	Y	-	-	-	Y	-	Y	Y	-	
DAYDREAM 1	MCPD	Y	Y	Y	Y	Y	Y	Y	Y	Y	
DEVONDALE 1	SDPD	Y	Y	Y	-	Y	Y	Y	Y	Y	
DIAMOND 1	SDPD	Y	-	-	-	-	Y	Y	-	-	
DILBONG 1	SDPD	Y	-	-	-	Y	-	Y	Y	-	
DORCA 1	V_{shale}	Y	Y	Y	-	Y	Y	Y	-	-	
DULACCA 1	MARPD	N	-	-	-	N	Y	Y	Y	Y	
DURHAM DEEP 1	MARPD	N	N	N	Y	N	Y	Y	Y	Y	
DURHAM RANCH 1	MARPD	N	-	-	-	N	-	Y	Y	-	
DURHAM RANCH 10	MARPD	N	-	-	-	-	-	Y	-	-	
DURHAM RANCH 11	MARPD	N	-	-	-	N	-	Y	Y	-	
DURHAM RANCH 12	MARPD	N	N	N	Y	-	-	Y	Y	-	
DURHAM RANCH 13	MARPD	N	-	N	-	-	-	Y	Y	-	
DURHAM RANCH 15	MARPD	N	-	-	-	N	-	Y	Y	-	
DURHAM RANCH 18	MARPD	N	-	-	-	N	-	Y	Y	-	
DURHAM RANCH 20	MARPD	N	-	N	-	-	-	Y	Y	-	
DURHAM RANCH 21	MARPD	N	-	-	-	N	-	Y	Y	-	

Well Name	Database	GAMMA_RAY	NEUTRON	DENSITY	PDPE	SONIC	Resistivity	V_{shale}	φ_T and φ_E	Permeability	Comments
DURHAM RANCH 23	MARPD	N	N	N	-	-	-	Y	Y	-	
DURHAM RANCH 27	MARPD	N	-	-	-	-	-	Y	-	-	
DURHAM RANCH 29	MARPD	N	-	N	Y	N	-	Y	Y	-	
DURHAM RANCH 37	MARPD	N	-	N	-	-	-	Y	Y	-	
DURHAM RANCH 42	MARPD	N	-	N	-	-	-	Y	Y	-	
DURHAM RANCH 57	MARPD	N	-	N	-	N	-	Y	-	-	
DURHAM RANCH 59	MARPD	N	-	-	Y	-	-	Y	-	-	
DURHAM RANCH 61	MARPD	N	N	N	Y	N	Y	Y	Y	-	
DURHAM RANCH 62	MARPD	N	-	N	-	-	-	Y	Y	-	
DURHAM RANCH 91	MARPD	N	-	N	Y	-	-	Y	Y	-	
DURHAM RANCH 92	MARPD	N	-	N	-	-	-	Y	Y	-	
DURHAM RANCH 97	MARPD	N	-	N	-	-	-	Y	Y	-	
EDENDALE 1	SDPD	Y	Y	Y	-	Y	Y	Y	Y	-	
EMU APPLE 4	V_{shale}	Y	Y	Y	Y	Y	Y	Y	-	-	
FAIRVIEW 128	MARPD	N	-	-	Y	-	-	Y	-	-	
FAIRVIEW 131	MARPD	N	-	-	Y	-	-	Y	-	-	
FAIRVIEW 32	MARPD	N	-	-	-	-	-	Y	-	-	
FAIRYMOUNT 1	SDPD	Y	Y	Y	Y	Y	Y	Y	Y	Y	
FANTOME 1	MARPD	N	Y	Y	-	N	Y	Y	Y	Y	
FERRETT 1	MARPD	Y	-	-	-	Y	-	Y	Y	-	
FORKES CREEK 1	SDPD	Y	Y	Y	-	Y	Y	Y	Y	Y	
FORMOSA DOWNS 1	SDPD	Y	Y	Y	-	Y	Y	Y	Y	Y	
FRENEAU 1	SDPD	Y	Y	Y	Y	Y	Y	Y	Y	Y	

Well Name	Database	GAMMA_RAY	NEUTRON	DENSITY	PDPE	SONIC	Resistivity	V_{shale}	φ_T and φ_E	Permeability	Comments
GAMBIER PARK 1	MCPD	Y	Y	Y	-	Y	-	Y	Y	-	
GARAH 1	SDPD	Y	-	-	-	Y	-	Y	Y	-	
GIDDI GIDDI 1	SDPD	Y	-	-	-	Y	Y	Y	Y	-	
GIL GIL 1	SDPD	Y	-	-	-	Y	-	-	-	-	Logs did not penetrate any of the zones of interest.
GILGAI 1	SDPD	Y	-	-	-	Y	Y	Y	Y	-	
GILIGULGUL 1	MARPD	-	-	-	-	Y	-	-	Y	-	
GLEN 1	SDPD	Y	Y	Y	Y	Y	Y	Y	Y	Y	
GLENMORGAN 1	V_{shale}	Y	Y	Y	-	Y	Y	Y	-	-	
GRAIL NORTH 1	SDPD	Y	Y	Y	-	Y	Y	Y	Y	Y	
GUMS 1	SDPD	Y	Y	Y	-	Y	Y	Y	Y	Y	
GURULMUNDI 1	MARPD	N	-	-	-	N	Y	Y	Y	-	
HALFMOON 1	SDPD	Y	Y	Y	-	Y	Y	Y	Y	Y	
HARICOT 1	V_{shale}	Y	Y	Y	-	Y	Y	Y	-	-	
HAYES CREEK 1	SDPD	Y	-	-	-	Y	-	Y	Y	-	
HEIDI 1	SDPD	Y	-	-	-	Y	Y	Y	Y	-	
HERMITAGE 1	MARPD	N	N	N	Y	N	Y	Y	Y	Y	
HOADLEYS 1	SDPD	Y	Y	Y	Y	Y	Y	Y	Y	Y	
HOLLYROOD 3	V_{shale}	Y	Y	Y	Y	Y	Y	Y	-	-	
HORSESHOE 1	MCPD	Y	Y	Y	-	Y	Y	Y	Y	-	
HORSESHOE 2	MCPD	Y	Y	Y	-	Y	Y	Y	Y	-	
HUMBUG CREEK 1	SDPD	Y	-	-	-	Y	Y	Y	Y	-	
HUMBUG CREEK 2	SDPD	Y	-	-	-	Y	-	Y	Y	-	
IMINBAH 1	SDPD	Y	-	-	-	Y	-	Y	Y	-	
KEGGABILLA 1	SDPD	Y	-	Y	-	Y	-	Y	Y	-	
KENYA EAST GW7	SDPD	Y	Y	Y	Y	Y	Y	Y	Y	Y	
KILLALOE 1	SDPD	Y	-	-	-	B	-	Y	-	-	
KILMICHAEL 1	V_{shale}	Y	Y	Y	Y	Y	Y	Y	-	-	
KINKABILLA CREEK 1	SDPD	Y	-	-	-	Y	Y	Y	Y	-	

Well Name	Database	GAMMA_RAY	NEUTRON	DENSITY	PDPE	SONIC	Resistivity	V_{shale}	φ_T and φ_E	Permeability	Comments
KOGAN 1	SDPD	Y	-	-	-	B	Y	Y	-	-	
KOGAN SOUTH 1	SDPD	Y	-	-	-	Y	Y	Y	Y	-	
KOORINGA 1	MARPD	N	-	-	-	-	Y	Y	-	-	
LANCEWOOD 1	V_{shale}	Y	Y	Y	-	Y	Y	Y	-	-	
LAWSON 1	SDPD	Y	-	-	-	Y	Y	Y	Y	-	
LEICHHARDT 1	SDPD	Y	-	-	-	Y	Y	Y	Y	-	
MAXIMA 1	SDPD	Y	-	-	-	Y	Y	Y	Y	-	
MAXIMA MAX 1	SDPD	Y	-	-	-	Y	Y	Y	Y	-	
MAYFIELD 1	V_{shale}	Y	Y	Y	-	Y	Y	Y	-	-	
MEANDARRA 1	SDPD	Y	-	-	-	Y	-	Y	Y	-	
MEELEEBEE 1	MARPD	-	-	-	-	N	Y	-	-	-	
MENTOR 1	MCPD	Y	-	-	-	Y	Y	Y	Y	-	
MERIVALE 1	V_{shale}	Y	Y	Y	-	Y	Y	Y	-	-	
MERIVALE 7 ST1	VSH	Y	Y	Y	Y	Y	Y	Y	-	-	
MERIVALE 8	V_{shale}	Y	Y	Y	Y	Y	Y	Y	-	-	
MERRIT 1		Y	Y	Y	-	Y	Y	Y	Y	Y	
MILES 1	MARPD	N	N	N	-	N	Y	Y	Y	Y	
MILGARRA 1	SDPD	Y	Y	Y	Y	Y	-	Y	Y	-	
MINDAGABIE 1	SDPD	Y	Y	Y	-	Y	Y	Y	Y	Y	
MIREEKA 1	SDPD	Y	Y	Y	-	-	-	Y	-	-	
MOA 1	V_{shale}	Y	-	Y	Y	Y	Y	Y	-	-	
MOONIE 16	MPD	N	-	-	-	Y	Y	Y	Y	-	
MOONIE 21	MPD	N	-	-	-	Y	Y	Y	Y	-	
MOONIE 23	MPD	N	-	-	-	Y	Y	Y	Y	-	
MOONIE 24	MPD	N	-	-	-	Y	Y	Y	Y	-	
MOONIE 25	MPD	N	-	-	-	Y	Y	Y	Y	-	
MOONIE 27	MPD	N	-	-	-	Y	Y	Y	Y	-	
MOONIE 28	MPD	N	-	-	-	Y	Y	Y	Y	-	
MOONIE 31	MPD	N	B	Y	-	Y	Y	Y	Y	Y	
MOONIE 33	MPD	N	Y	Y	-	Y	Y	Y	Y	Y	
MOONIE 34	MPD	N	B	Y	-	Y	Y	Y	Y	-	
MOONIE 36	MPD	N	B	Y	-	Y	Y	Y	Y	-	

Well Name	Database	GAMMA_RAY	NEUTRON	DENSITY	PDPE	SONIC	Resistivity	V_{shale}	φ_T and φ_E	Permeability	Comments
MOONIE 37	MPD	N	-	-	-	Y	Y	Y	Y	-	
MOONIE 38	MPD	N	-	-	-	Y	Y	Y	Y	-	
MOONIE 39	MPD	Y	B	Y	-	Y	Y	Y	Y	Y	
MOONIE 40	MPD	Y	Y	Y	-	B	Y	Y	Y	-	
MOONIE 41	MPD	Y	Y	Y	-	Y	Y	Y	Y	Y	
MOONIE 42	MPD	N	Y	Y	-	Y	Y	Y	Y	-	
MOONIE 43	MPD	Y	-	Y	-	Y	Y	Y	Y	-	
MOONIE 44	MPD	Y	-	Y	-	Y	Y	Y	Y	-	
MUGGLETON 1	MARPD	N	-	-	-	N	Y	Y	-	-	
MURILLA 1	SDPD	Y	-	-	-	Y	-	Y	Y	-	
MUYA CREEK 1	V_{shale}	Y	Y	Y	-	Y	Y	Y	-	-	
MYALL CREEK 3	MCPD	Y	-	-	-	Y	Y	Y	Y	-	
MYALL CREEK 4	MCPD	Y	-	-	-	Y	Y	Y	Y	-	
MYALL CREEK 6	MCPD	Y	-	-	-	Y	Y	Y	Y	-	
MYALL CREEK 7	MCPD	Y	Y	Y	Y	Y	Y	Y	Y	-	
MYALL CREEK 8	MCPD	Y	-	-	-	Y	Y	Y	Y	-	
MYALL CREEK 9	MCPD	Y	Y	Y	Y	Y	Y	Y	Y	Y	
MYALL CREEK EAST 1	MCPD	Y	Y	Y	Y	Y	Y	Y	Y	-	
NAMARAH 4	SDPD	Y	Y	Y	-	-	Y	Y	-	-	
NAMARAH 6	SDPD	Y	Y	Y	Y	Y	-	Y	Y	Y	
NIBBLEFOOT 1	V_{shale}	Y	Y	Y	-	Y	Y	Y	-	-	
NOMBY 1	SDPD	Y	-	-	-	Y	-	Y	Y	-	
NOORINDOO 2	MCPD	Y	-	-	-	Y	Y	Y	Y	-	
NORKAM 1	MCPD	Y	Y	Y	Y	Y	Y	Y	Y	Y	
NORTH ANNABELLE 1	V_{shale}	Y	Y	Y	-	Y	Y	Y	-	-	
NORTH CHERWONDAH 1	MARPD	N	-	-	-	N	Y	Y	Y	-	
OGILVIE CREEK 1	MCPD	Y	Y	Y	Y	Y	Y	Y	Y	Y	
OGILVIE CREEK 2	MCPD	Y	Y	Y	Y	Y	Y	Y	Y	Y	
OVERSTON 1	MCPD	Y	Y	Y	Y	Y	Y	Y	Y	-	
PALOMA 1	SDPD	Y	-	-	-	Y	-	Y	Y	Y	

Well Name	Database	GAMMA_RAY	NEUTRON	DENSITY	PDPE	SONIC	Resistivity	V_{shale}	φ_T and φ_E	Permeability	Comments
PARKNOOK 3	SDPD	Y	Y	Y	-	Y	Y	Y	Y	Y	
PARKNOOK 7	SDPD	Y	-	Y	Y	Y	-	Y	-	-	
PEAT 12	MARPD	N	N	N	Y	N	Y	Y	Y	Y	
PEAT 15	MARPD	N	-	N	Y	N	Y	Y	Y	Y	
PEAT 27	MARPD	N	-	N	-	-	-	Y	Y	-	
PEAT 32	MARPD	N	-	N	-	-	-	Y	Y	-	
PEMBROKE 1	V_{shale}	Y	Y	Y	-	Y	Y	Y	-	-	
PINE HILLS 7	MARPD	N	N	N	Y	N	Y	Y	Y	Y	
PINE RIDGE 15	VSH	Y	Y	Y	-	Y	Y	Y	-	-	
PINEVIEW 1	MARPD	N	N	N	-	N	Y	Y	Y	Y	
PONY HILLS EAST 1	MARPD	N	-	-	Y	-	-	Y	-	-	
RASLIE 6	V_{shale}	Y	Y	Y	-	Y	Y	Y	-	-	
REBEN DOWNS 1	V_{shale}	Y	Y	Y	-	Y	Y	Y	-	-	
REDBANK 1	SDPD	Y	-	-	-	Y	Y	Y	Y	-	
REEDY CREEK INJ2-P	MARPD	N	N	N	Y	-	Y	Y	Y	Y	
REEDY CREEK INJ4-P	MARPD	N	N	N	Y	-	Y	Y	Y	Y	
REEDY CREEK MB3-H	MARPD	N	N	N	Y	N	Y	Y	Y	Y	
RIDGEWOOD 6	SDPD	Y	Y	Y	Y	Y	Y	Y	Y	Y	
RIVERSIDE 1	MCPD	Y	Y	Y	Y	Y	Y	Y	Y	Y	
RIVERSIDE SOUTH 1	MCPD	Y	-	-	-	Y	Y	Y	Y	-	
ROCKFERN 1	SDPD	Y	Y	Y	-	Y	Y	Y	Y	-	
ROCKWOOD 1	SDPD	Y	-	-	-	Y	Y	Y	-	-	Gas well. Only V_{shale} calculated. Rest of measurements from Rockwood 2
ROCKWOOD 2	SDPD	Y	-	-	-	Y	-	Y	Y	-	
ROMA 8	V_{shale}	Y	-	-	-	-	Y	Y	-	-	
ROMA DOWNS 1	V_{shale}	Y	Y	Y	Y	Y	Y	Y	-	-	

Well Name	Database	GAMMA_RAY	NEUTRON	DENSITY	PDPE	SONIC	Resistivity	V_{shale}	φ_T and φ_E	Permeability	Comments
ROOKWOOD WEST 1	V_{shale}	Y	Y	Y	Y	Y	Y	Y	-	-	
ROSWIN 1	SDPD	Y	Y	Y	Y	B	-	Y	-	-	
SAMARI PLAINS 2	V_{shale}	Y	Y	Y	-	Y	Y	Y	-	-	
SANDY CREEK 2		Y	Y	Y	-	Y	Y	Y	-	Y	
SCOTIA 16	MARPD	N	-	N	Y	N	Y	Y	Y	Y	
SCOTIA 20	MARPD	N	-	N	Y	N	-	Y	Y	-	
SCOTIA 6	MARPD	N	-	-	-	N	Y	Y	Y	-	
SCOTIA 9	MARPD	N	N	N	Y	N	Y	Y	Y	Y	
SLATEHILL 1	MARPD	N	N	N	Y	N	Y	Y	Y	Y	
SOUTH BURUNGA 1	MARPD	N	-	-	-	N	Y	Y	Y	-	
SOUTHWOOD 1	SDPD	-	-	-	-	Y	-	-	-	-	No Gamma Ray to calculate V_{shale}
SPRING GULLY 10	MARPD	N	-	N	-	-	-	Y	Y	-	
SPRING GULLY 115	MARPD	N	-	N	Y	-	-	Y	Y	-	
SPRING GULLY 16	MARPD	N	N	N	Y	N	Y	Y	Y	-	
SPRING GULLY 19	MARPD	N	-	N	-	-	-	Y	Y	-	
SPRING GULLY 22	MARPD	N	N	N	Y	N	Y	Y	Y	Y	
SPRING GULLY 24	MARPD	N	-	-	Y	-	-	Y	-	-	
SPRING GULLY 27	MARPD	N	-	N	Y	N	-	Y	Y	-	
SPRING GULLY 30	MARPD	N	-	N	Y	-	-	Y	Y	-	
SPRING GULLY 33	MARPD	N	-	N	Y	-	-	Y	Y	-	
SPRING GULLY 36	MARPD	N	-	N	Y	N	-	Y	Y	-	
SPRING GULLY 38	MARPD	N	-	N	-	-	-	Y	Y	-	

Well Name	Database	GAMMA_RAY	NEUTRON	DENSITY	PDPE	SONIC	Resistivity	V_{shale}	φ_T and φ_E	Permeability	Comments
SPRING GULLY 40	MARPD	N	-	N	-	-	-	Y	Y	-	
SPRING GULLY 41	MARPD	N	N	-	-	-	-	Y	-	-	
SPRING GULLY 45	MARPD	N	-	N	Y	-	-	Y	Y	-	
SPRING GULLY 46	MARPD	N	-	-	-	-	-	Y	-	-	
SPRING GULLY 50	MARPD	N	-	-	-	-	-	Y	-	-	
SPRING GULLY 51	MARPD	N	-	-	-	-	-	Y	-	-	
SPRING GULLY 52	MARPD	N	-	-	Y	-	-	Y	-	-	
SPRING GULLY 53	MARPD	N	-	-	Y	-	-	Y	-	-	
SPRING GULLY 54	MARPD	N	-	N	Y	-	-	Y	Y	-	
SPRING GULLY 55	MARPD	N	-	-	-	-	-	Y	-	-	
SPRING GULLY 57	MARPD	N	-	N	-	-	-	Y	Y	-	
SPRING GULLY 58	MARPD	N	-	N	-	-	-	Y	Y	-	
SPRING GULLY 59	MARPD	N	-	N	-	-	-	Y	Y	-	
SPRING GULLY 61	MARPD	N	-	-	-	N	-	Y	Y	-	
SPRING GULLY 65	MARPD	N	-	N	-	-	-	Y	Y	-	
SPRING GULLY 66	MARPD	N	-	N	-	-	-	Y	Y	-	
SPRING GULLY 7	MARPD	N	-	N	-	-	-	Y	Y	-	
SPRING GULLY 88	MARPD	N	-	N	-	-	-	Y	Y	-	
SPRING GULLY 9	MARPD	N	-	N	-	-	-	Y	Y	-	
SPRING GULLY 90	MARPD	N	-	N	-	-	-	Y	Y	-	

Well Name	Database	GAMMA_RAY	NEUTRON	DENSITY	PDPE	SONIC	Resistivity	V_{shale}	φ_T and φ_E	Permeability	Comments
SPRING GULLY 96	MARPD	N	-	N	-	-	-	Y	Y	-	
STRATHVALE 1	V_{shale}	Y	Y	Y	-	Y	Y	Y	-	-	
SUSSEX DOWNS 1	SDPD	Y	-	-	-	Y	-	Y	Y	-	
TALLAWALLA 1	MARPD	N	-	-	-	N	Y	Y	Y	-	
TAROOM 17	MARPD	N	-	-	-	N	Y	Y	Y	-	
TASMANIA 1	SDPD	Y	Y	Y	Y	Y	Y	Y	Y	Y	
TAYLOR 6	V_{shale}	Y	Y	Y	-	Y	Y	Y	-	-	
TEATREE 1	SDPD	Y	Y	Y	-	Y	Y	Y	Y	Y	
THRUPP 1	V_{shale}	Y	Y	Y	-	Y	Y	Y	-	-	
TIMOTHY 1	SDPD	Y	-	-	-	Y	Y	Y	Y	-	
TINTAGEL 1	SDPD	Y	-	Y	-	-	Y	Y	-	-	
TOBY 2	SDPD	Y	Y	-	Y	Y	Y	Y	Y	Y	
TOBY 3	SDPD	Y	Y	Y	Y	Y	Y	Y	Y	Y	
TOBY 4	SDPD	Y	Y	-	Y	Y	Y	Y	Y	Y	
TOOMBILLA EAST 1	SDPD	-	-	-	-	Y	-	-	-	-	
TORYBOY 1	V_{shale}	Y	Y	Y	-	Y	Y	Y	-	-	
TRELINGA 1	MARPD	N	N	N	-	N	Y	Y	Y	Y	
WAAR WAAR 19	SDPD	Y	Y	Y	Y	Y	-	Y	Y	Y	
WAGGAMBA 2	SDPD	Y	Y	Y	Y	Y	Y	Y	Y	Y	
WANDOAN 1	MARPD	N	-	-	-	N	Y	Y	-	-	
WAROOBY SOUTH 3	V_{shale}	Y	Y	Y	Y	Y	Y	Y	-	-	
WARRIOR 1	V_{shale}	Y	-	Y	-	Y	Y	Y	-	-	
WASHPOOL 2	V_{shale}	Y	Y	Y	-	Y	Y	Y	-	-	
WEST BRAEMAR 1	SDPD	Y	B	Y	Y	Y	Y	Y	Y	Y	
WEST WANDOAN 1	MARPD	N	N	N	Y	N	Y	Y	Y	Y	
WILLAROO 1	SDPD	Y	Y	Y	Y	Y	Y	Y	Y	Y	
WILLOWBE 1	SDPD	Y	-	-	-	Y	-	Y	Y	-	
WINGNUT 1	V_{shale}	Y	Y	Y	-	Y	Y	Y	-	-	
WINGNUT 2		Y	Y	Y	-	Y	Y	Y	-	Y	

Well Name	Database	GAMMA_RAY	NEUTRON	DENSITY	PDPE	SONIC	Resistivity	V_{shale}	φ_T and φ_E	Permeability	Comments
WOLEEBEE CREEK GW4	MARPD	N	N	N	Y	N	Y	Y	Y	Y	
WOODVILLE 1	SDPD	Y	B	Y	Y	Y	Y	Y	Y	Y	
XYLANE 1	SDPD	-	-	-	-	-	Y	-	-	-	
XYL-L 1	SDPD	-	-	-	-	-	Y	-	-	-	
XYLON 1	SDPD	-	-	-	-	-	Y	-	-	-	
YANCO 1	V_{shale}	Y	Y	Y	-	Y	Y	Y	-	-	
YARRILL CREEK 1	SDPD	Y	-	-	-	Y	-	Y	Y	-	
YULEBA 1	V_{shale}	Y	Y	Y	Y	Y	Y	Y	-	-	
TOTAL		285	133	179	91	230	204	285	208	73	

Figure 23 Map showing wells with a gamma ray log.

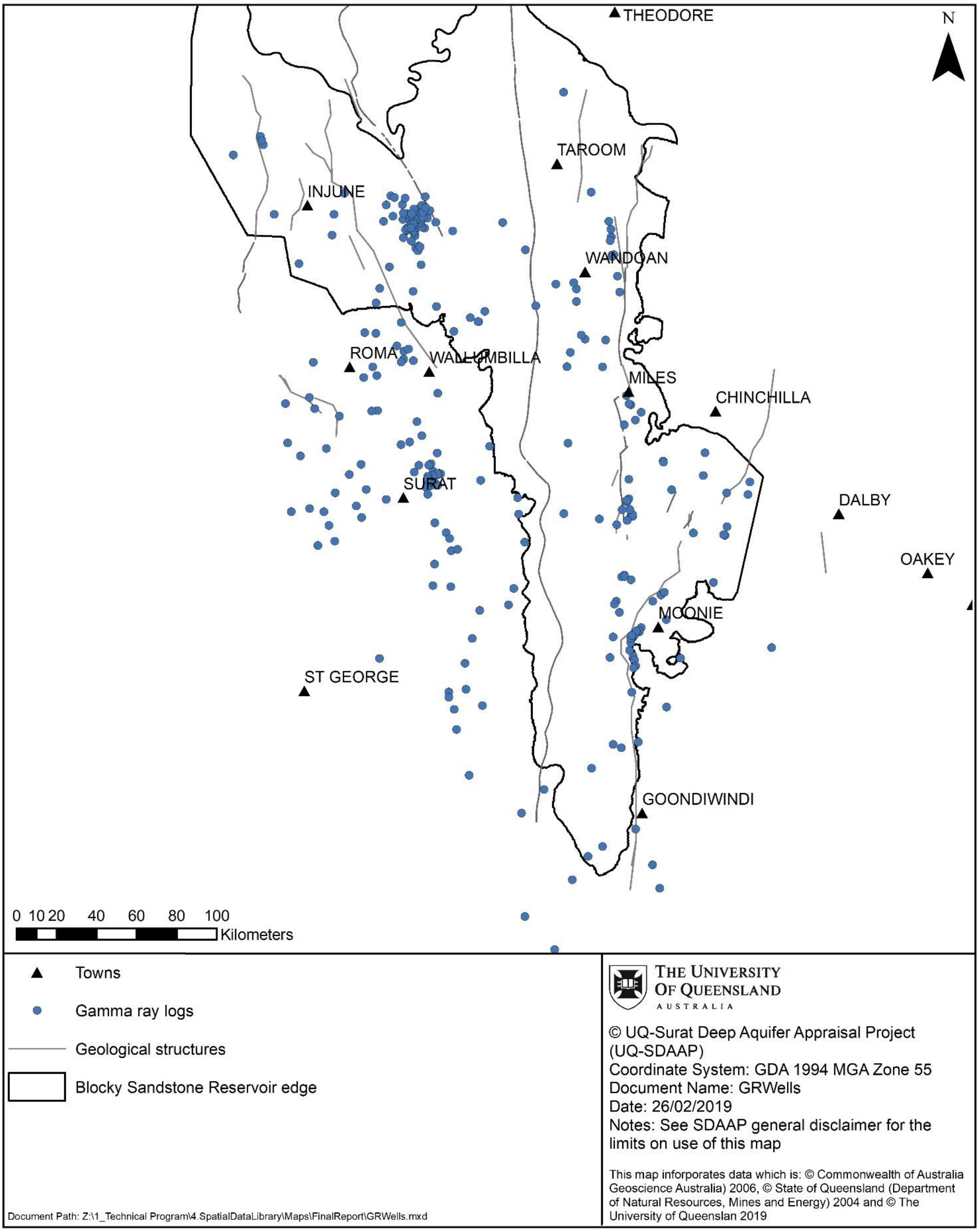


Figure 24 Map showing wells with a neutron log.

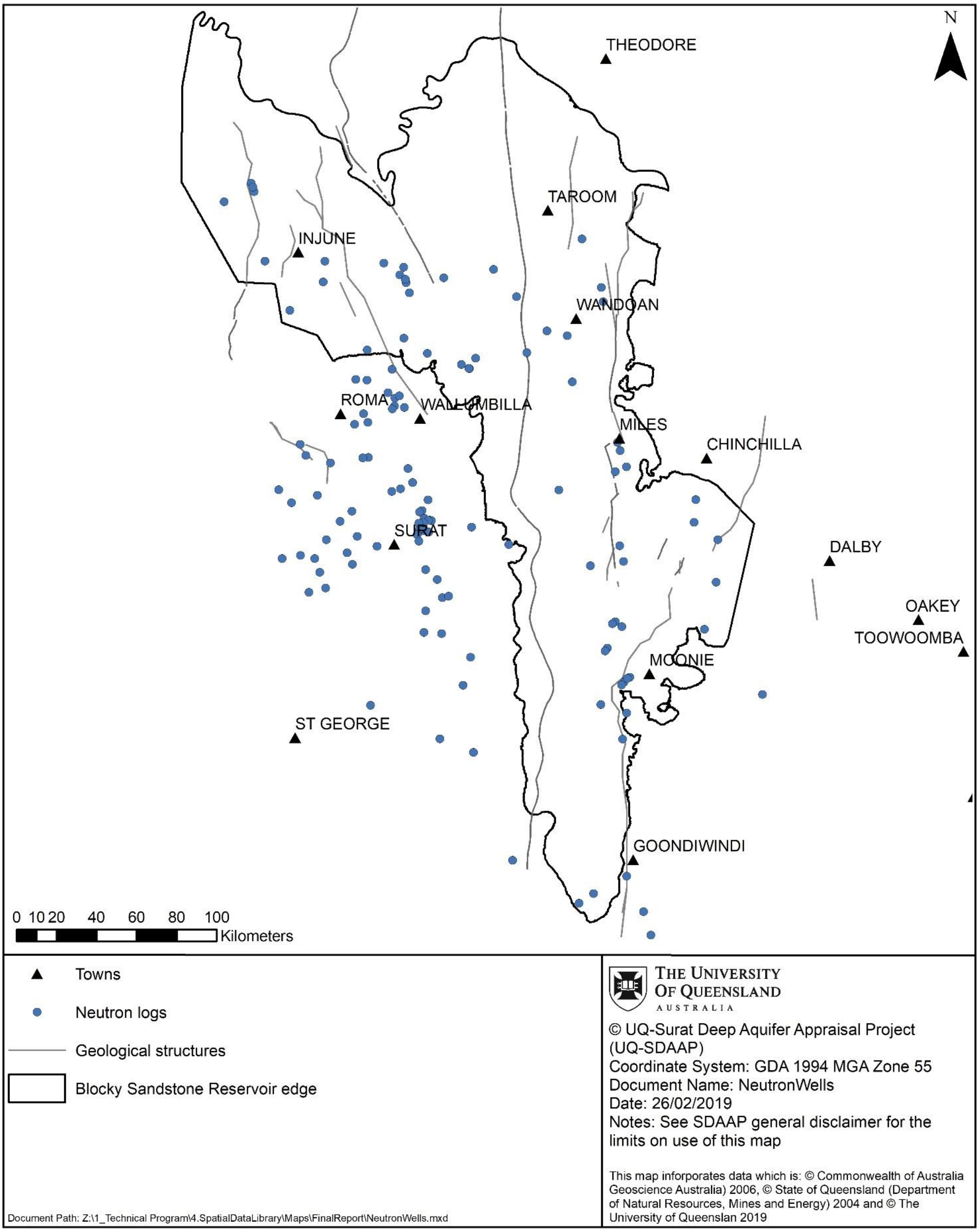


Figure 25 Map showing wells with a density log.

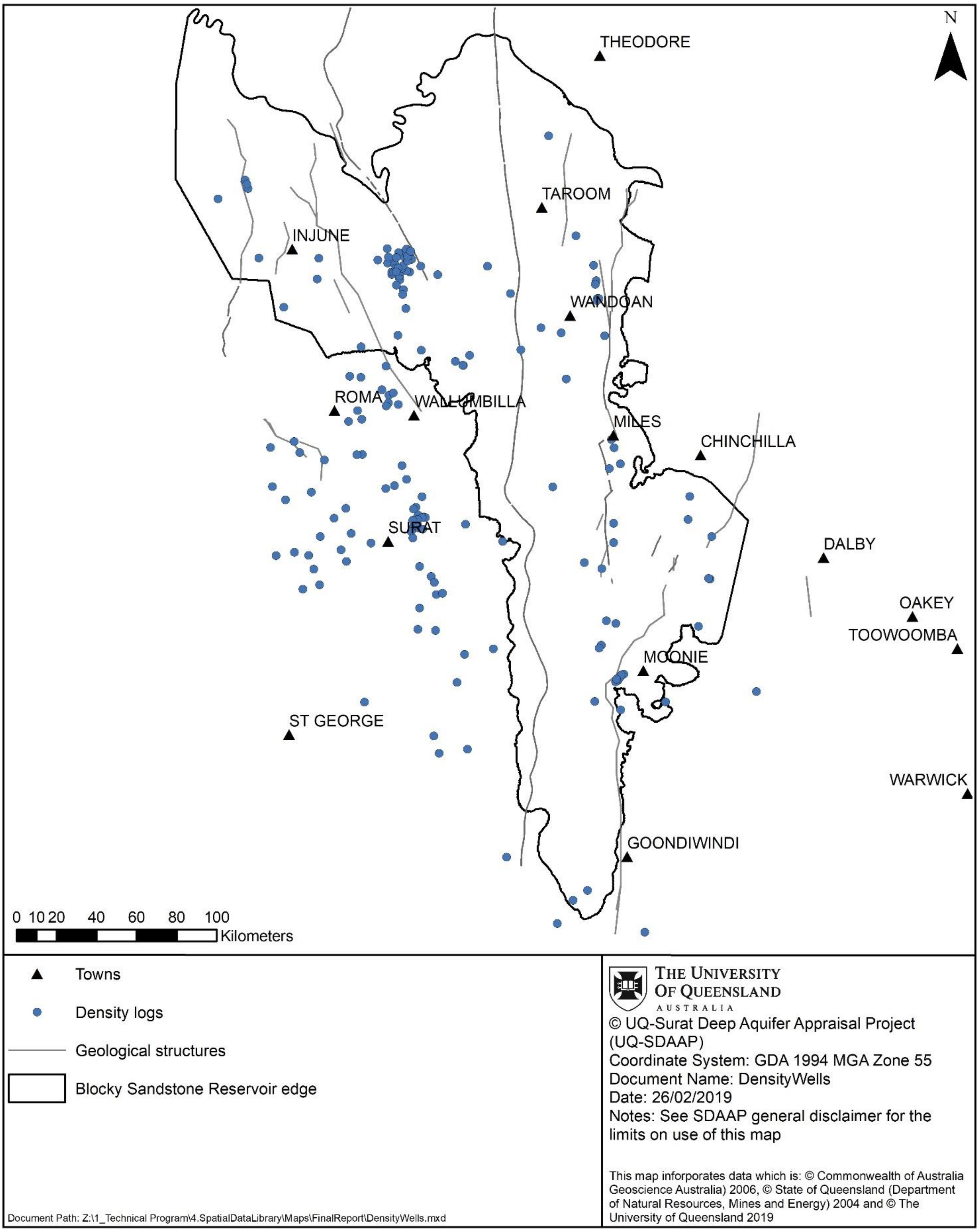


Figure 26 Map showing wells with a photoelectric factor log.

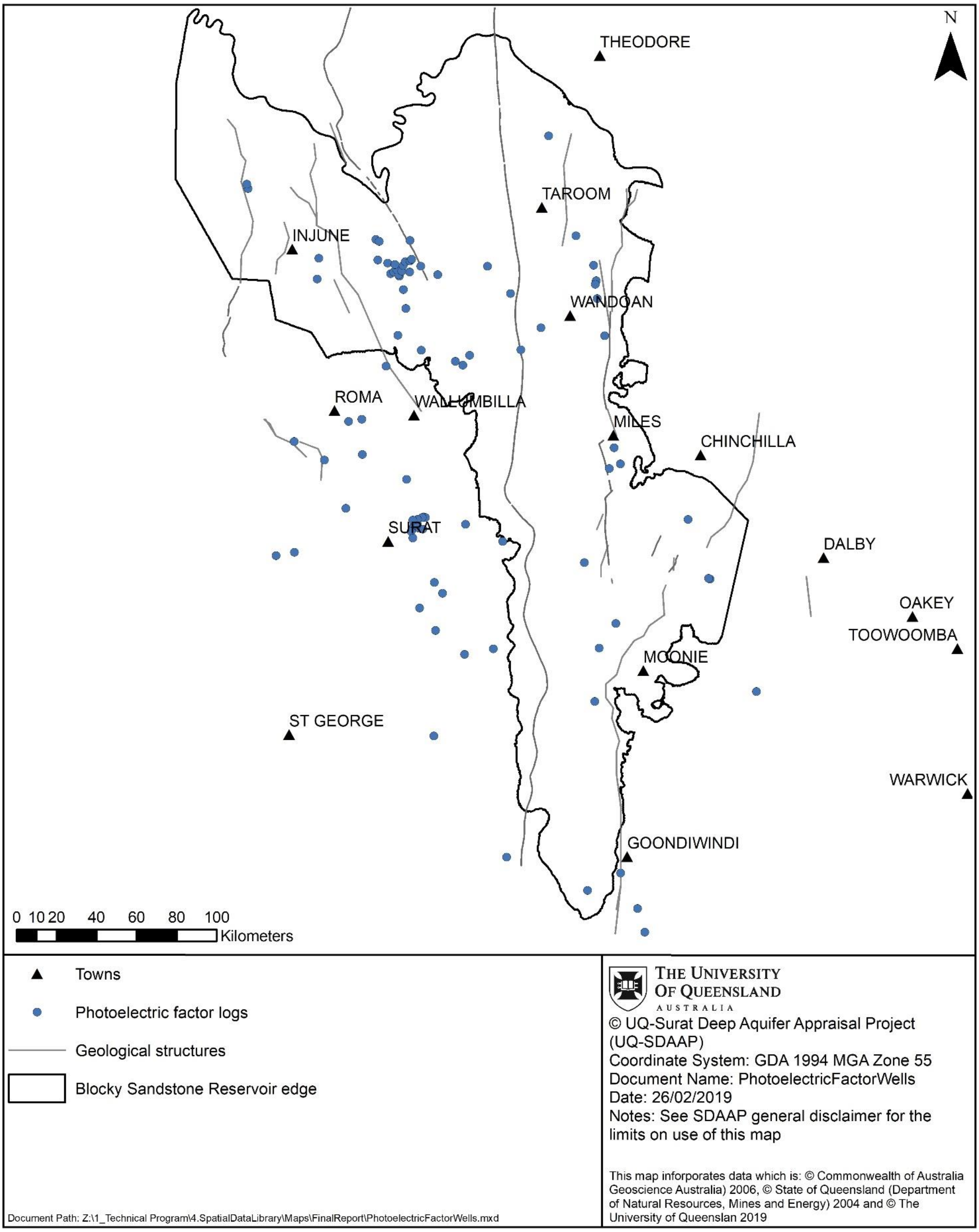


Figure 27 Map showing wells with a compressional slowness log.

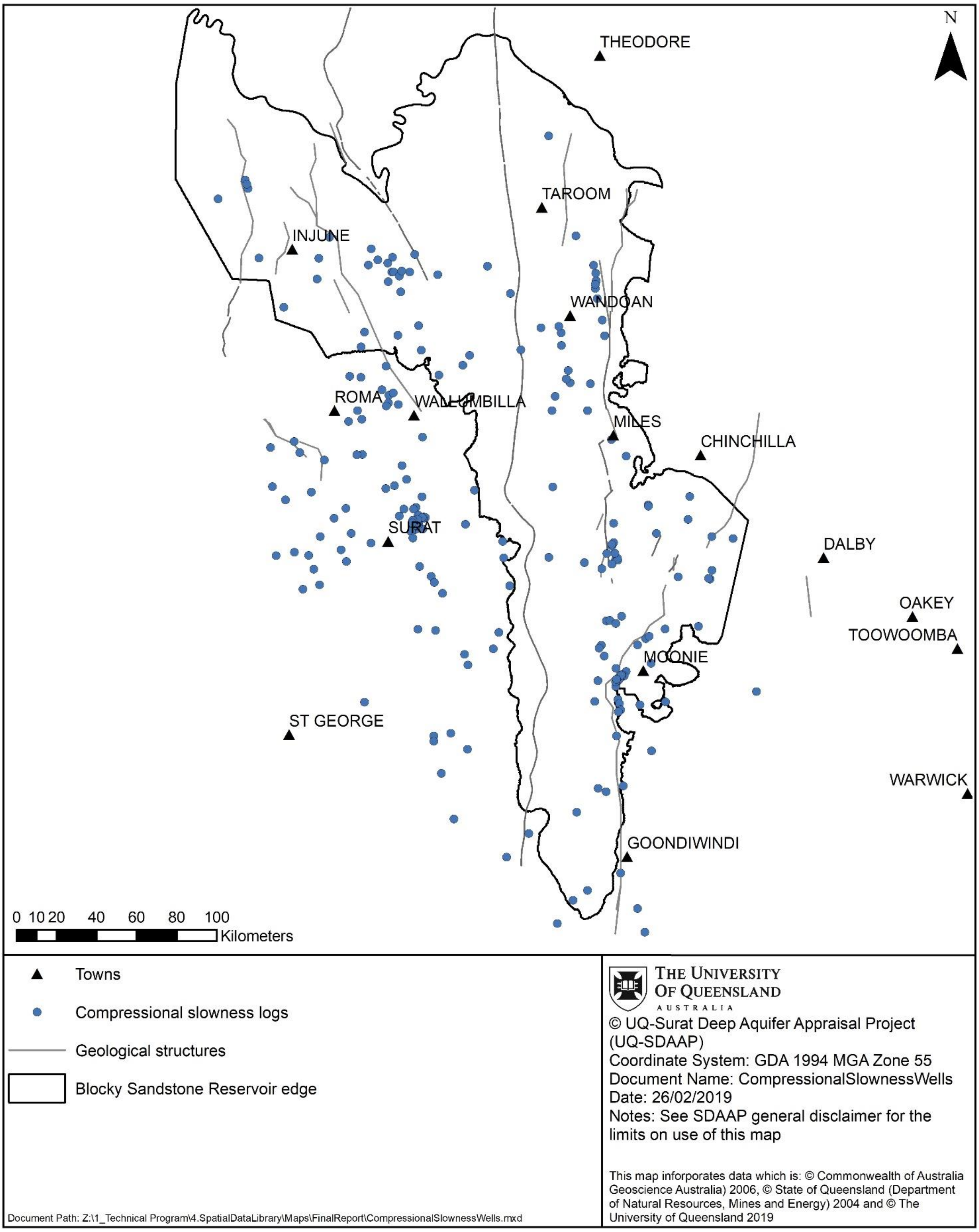
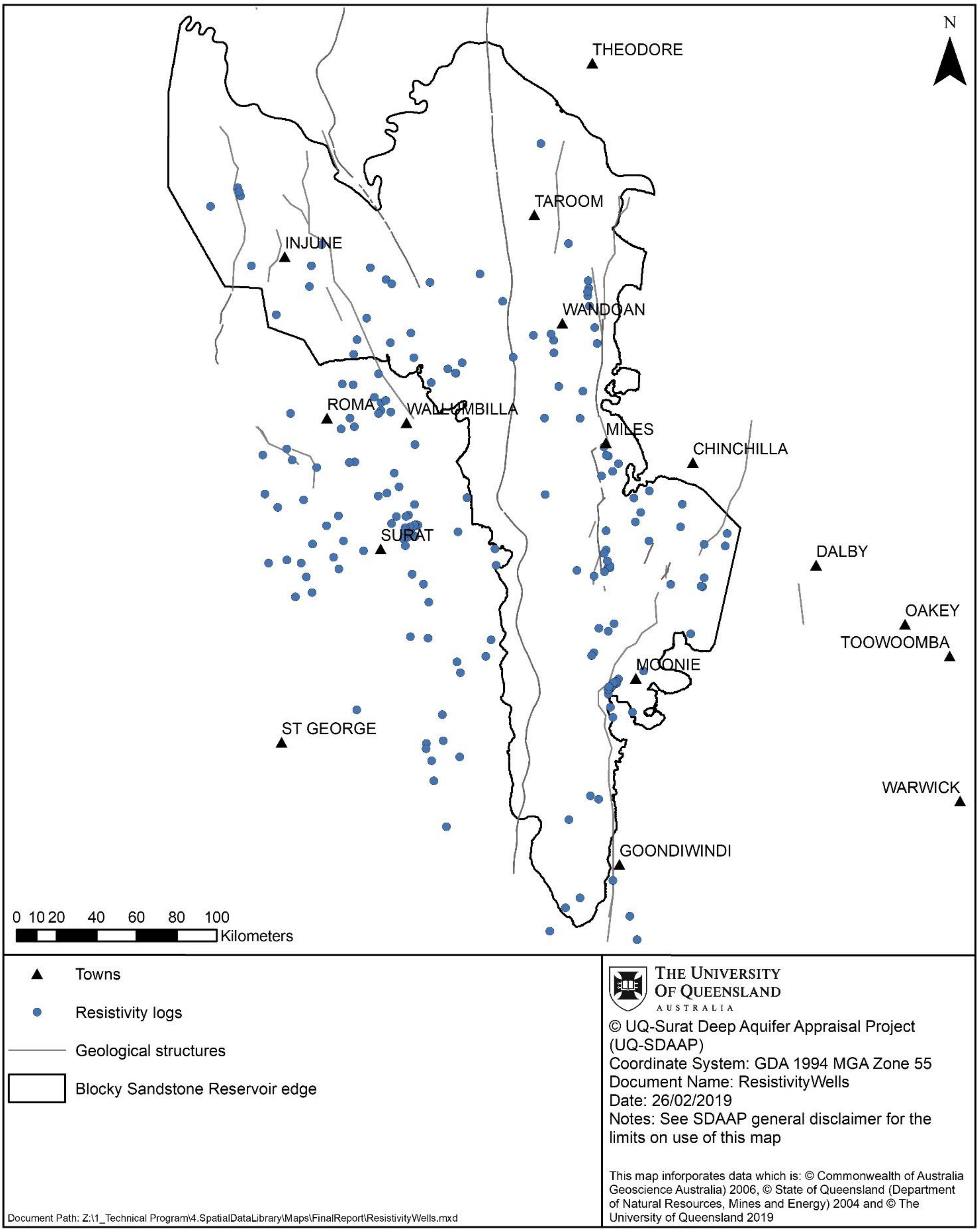


Figure 28 Map showing wells with resistivity logs.



15.2 Appendix 2: V_{shale} parameters

Table 9 Parameters used for calculating V_{shale}.

Well	GR_Matrix (API)	GR_Shale (API)
ALICK CREEK 1	40.96	142.86
ALTON SOUTH 1	30.64	126.19
AMOOLEE 1	19.37	193.25
ARLINGTON 1	15.17	124.14
AUBURN 1	39.82	139.50
AVONDALE 4	21.14	98.99
BAINBILLA 2	26.26	136.08
BALLAROO 1	25.90	126.80
BALLYMENA 1	24.00	124.00
BEAUFORT 6	33.17	154.29
BELBRI 2	27.98	136.49
BENGALLA 1	19.37	193.25
BENNETT 1	18.62	106.90
BENNETT 2	28.97	122.42
BENNETT 4	20.35	127.59
BENNETT NORTH 1	23.80	118.97
BENTLEY 1	18.62	106.90
BILBY 1	31.17	211.87
BOOBERANNA 1	29.05	118.26
BOOKOOI 1	30.81	132.31
BOOROONDOO 1	24.00	124.00
BRAEMAR 1	24.00	124.00
BRIGALOW CREEK 1	16.64	93.36
BULWER 1	38.92	122.61
BUNGUNYA 1	30.64	134.74
BURGOYNE 1	19.37	193.25
CABAWIN 1	31.64	128.47
CABAWIN 3	19.83	148.01
CABAWIN 4	32.13	146.71
CANEON 1	19.37	193.25
CARDIGAN 1	23.64	117.19
CERULEAN 2	19.60	166.90
CHANTARA 1	24.71	140.47

Well	GR_Matrix (API)	GR_Shale (API)
CHARLIE GW2	19.37	193.25
CHARLOTTE GW2	19.37	193.25
CHESTER 1	32.23	138.10
CHINCHILLA 4	19.37	193.25
CHURCHIE 1	29.75	150.46
CHURCHIE 11	44.93	176.43
CHURCHIE 1A	36.82	189.32
CHURCHIE 2	19.24	148.23
CHURCHIE 3	38.30	178.82
CHURCHIE 4	29.37	154.98
CHURCHIE 5	38.99	170.69
CHURCHIE 6	38.84	184.90
CHURCHIE 7	41.52	165.90
CHURCHIE WEST 1	28.78	171.64
COALBAH 1	15.31	110.61
COBALT 1	20.15	182.79
COMBABULA 352 MON-P	19.37	193.25
CONDABRI 13	39.82	139.50
CONDABRI INJ2-P	39.82	139.50
CONDABRI MB9-H	39.82	139.50
CONLOI 1	20.61	100.00
CONN CREEK 1	26.18	125.39
COOCHIEMUDLO GW2	19.37	193.25
COXON CREEK 1	37.05	128.48
CROSSMAGLEN 1	27.28	124.16
CROWDER NORTH 1	33.81	111.11
DAVIDSON 1	24.00	124.00
DAYDREAM 1	36.37	148.08
DEVONDALE 1	24.00	124.00
DIAMOND 1	31.43	146.83
DILBONG 1	24.00	124.00
DORCA 1	26.27	134.38
DULACCA 1	39.82	139.50
DURHAM DEEP 1	19.37	193.25
DURHAM RANCH 1	30.00	160.00
DURHAM RANCH 10	30.00	160.00

Well	GR_Matrix (API)	GR_Shale (API)
DURHAM RANCH 11	30.00	160.00
DURHAM RANCH 12	30.00	160.00
DURHAM RANCH 13	30.00	160.00
DURHAM RANCH 15	30.00	160.00
DURHAM RANCH 18	30.00	160.00
DURHAM RANCH 20	30.00	160.00
DURHAM RANCH 21	30.00	160.00
DURHAM RANCH 23	30.00	160.00
DURHAM RANCH 27	30.00	160.00
DURHAM RANCH 29	30.00	160.00
DURHAM RANCH 37	30.00	160.00
DURHAM RANCH 42	30.00	160.00
DURHAM RANCH 57	30.00	160.00
DURHAM RANCH 59	30.00	160.00
DURHAM RANCH 61	30.00	160.00
DURHAM RANCH 62	30.00	160.00
DURHAM RANCH 91	19.37	193.25
DURHAM RANCH 92	30.00	160.00
DURHAM RANCH 97	30.00	160.00
EDENDALE 1	24.00	124.00
EMU APPLE 4	26.47	138.81
FAIRVIEW 128	30.00	160.00
FAIRVIEW 131	30.00	160.00
FAIRVIEW 32	30.00	160.00
FAIRYMOUNT 1	31.43	142.86
FANTOME 1	39.82	139.50
FERRETT 1	19.70	121.03
FORKES CREEK 1	17.38	134.42
FORMOSA DOWNS 1	35.21	135.72
FRENEAU 1	34.34	176.12
GAMBIER PARK 1	34.79	124.30
GARAH 1	28.26	115.08
GIDDI GIDDI 1	24.00	124.00
GILGAI 1	24.00	124.00
GLEN 1	24.00	124.00
GLENMORGAN 1	28.99	136.95

Well	GR_Matrix (API)	GR_Shale (API)
GRAIL NORTH 1	23.26	123.61
GUMS 1	24.00	124.00
GURULMUNDI 1	39.82	139.50
HALFMOON 1	24.00	124.00
HARICOT 1	21.84	156.82
HAYES CREEK 1	24.00	124.00
HEIDI 1	31.43	139.69
HERMITAGE 1	19.37	193.25
HOADLEYS 1	27.21	183.63
HOLLYROOD 3	28.10	125.39
HORSESHOE 1	28.18	160.45
HORSESHOE 2	22.38	145.90
HUMBUG CREEK 1	23.50	129.71
HUMBUG CREEK 2	24.00	124.00
IMINBAH 1	20.18	76.26
KEGGABILLA 1	28.26	140.48
KENYA EAST GW7	39.82	139.50
KILLALOE 1	29.84	139.69
KILMICHAEL 1	29.76	143.60
KINKABILLA CREEK 1	31.26	141.10
KOGAN 1	36.16	133.91
KOGAN SOUTH 1	24.00	124.00
KOORINGA 1	30.00	160.00
LANCEWOOD 1	22.97	119.62
LAWSON 1	24.00	124.00
LEICHHARDT 1	32.42	131.04
MAXIMA 1	24.00	124.00
MAXIMA MAX 1	24.00	124.00
MAYFIELD 1	28.85	127.42
MEANDARRA 1	24.00	124.00
MENTOR 1	20.63	136.06
MERIVALE 1	18.90	138.67
MERIVALE 7 ST1	25.52	144.47
MERIVALE 8	25.43	153.20
MERRIT 1	20.48	136.93
MILES 1	39.82	139.25

Well	GR_Matrix (API)	GR_Shale (API)
MILGARRA 1	24.00	124.00
MINDAGABIE 1	29.84	130.76
MIREEKA 1	34.60	147.02
MOA 1	22.07	119.24
MOONIE 16	30.00	168.77
MOONIE 21	30.00	163.98
MOONIE 23	25.20	163.98
MOONIE 24	19.21	168.77
MOONIE 25	30.00	159.18
MOONIE 27	26.40	163.98
MOONIE 28	30.00	168.77
MOONIE 31	30.00	140.00
MOONIE 33	10.89	159.18
MOONIE 34	30.00	140.00
MOONIE 36	30.00	140.00
MOONIE 37	30.00	178.36
MOONIE 38	25.21	163.98
MOONIE 39	30.00	140.00
MOONIE 40	30.00	173.57
MOONIE 41	30.00	168.78
MOONIE 42	30.00	163.98
MOONIE 43	30.00	159.18
MOONIE 44	30.00	140.00
MUGGLETON 1	19.37	193.25
MURILLA 1	24.00	124.00
MUYA CREEK 1	31.11	155.14
MYALL CREEK 3	26.80	143.86
MYALL CREEK 4	30.81	141.47
MYALL CREEK 6	29.07	171.48
MYALL CREEK 7	34.77	187.39
MYALL CREEK 8	38.26	170.97
MYALL CREEK 9	36.22	166.94
MYALL CREEK EAST 1	51.68	187.24
NAMARAH 4	36.19	155.69
NAMARAH 6	21.62	156.98
NIBBLEFOOT 1	26.65	98.68

Well	GR_Matrix (API)	GR_Shale (API)
NOMBY 1	22.70	119.84
NOORINDOO 2	76.71	145.78
NORKAM 1	40.62	161.72
NORTH ANNABELLE 1	29.77	115.86
NORTH CHERWONDAH 1	39.82	139.50
OGILVIE CREEK 1	29.01	152.80
OGILVIE CREEK 2	21.73	159.82
OVERSTON 1	33.05	167.53
PALOMA 1	38.30	126.54
PARKNOOK 3	16.50	157.10
PARKNOOK 7	37.78	135.72
PEAT 12	39.82	139.50
PEAT 15	39.82	139.50
PEAT 27	39.82	139.50
PEAT 32	39.82	139.50
PEMBROKE 1	32.01	112.48
PINE HILLS 7	19.37	193.25
PINE RIDGE 15	25.77	134.57
PINEVIEW 1	39.82	139.50
PONY HILLS EAST 1	30.00	160.00
RASLIE 6	31.90	154.05
REBEN DOWNS 1	14.67	158.89
REDBANK 1	19.52	134.93
REEDY CREEK INJ2-P	19.37	193.25
REEDY CREEK INJ4-P	19.37	193.25
REEDY CREEK MB3-H	19.37	193.25
RIDGEWOOD 6	21.62	140.48
RIVERSIDE 1	36.69	135.72
RIVERSIDE SOUTH 1	32.59	158.65
ROCKFERN 1	18.73	109.53
ROCKWOOD 1	27.46	138.89
ROCKWOOD 2	24.00	124.00
ROMA 8	15.96	99.72
ROMA DOWNS 1	28.62	141.33
ROOKWOOD WEST 1	27.67	133.63
ROSWIN 1	56.91	198.77

Well	GR_Matrix (API)	GR_Shale (API)
SAMARI PLAINS 2	25.17	116.37
SANDY CREEK 2	17.82	124.71
SCOTIA 16	39.82	139.50
SCOTIA 20	39.82	139.50
SCOTIA 6	39.82	139.50
SCOTIA 9	39.82	139.50
SLATEHILL 1	19.37	193.25
SOUTH BURUNGA 1	39.82	139.50
SPRING GULLY 10	30.00	160.00
SPRING GULLY 115	30.00	160.00
SPRING GULLY 16	30.00	160.00
SPRING GULLY 19	30.00	160.00
SPRING GULLY 22	30.00	160.00
SPRING GULLY 24	30.00	160.00
SPRING GULLY 27	30.00	160.00
SPRING GULLY 30	30.00	160.00
SPRING GULLY 33	30.00	160.00
SPRING GULLY 36	30.00	160.00
SPRING GULLY 38	30.00	160.00
SPRING GULLY 40	30.00	160.00
SPRING GULLY 41	30.00	160.00
SPRING GULLY 45	30.00	160.00
SPRING GULLY 46	30.00	160.00
SPRING GULLY 50	30.00	160.00
SPRING GULLY 51	30.00	160.00
SPRING GULLY 52	30.00	160.00
SPRING GULLY 53	30.00	160.00
SPRING GULLY 54	30.00	160.00
SPRING GULLY 55	30.00	160.00
SPRING GULLY 57	30.00	160.00
SPRING GULLY 58	30.00	160.00
SPRING GULLY 59	30.00	160.00
SPRING GULLY 61	30.00	160.00
SPRING GULLY 65	30.00	160.00
SPRING GULLY 66	30.00	160.00
SPRING GULLY 7	30.00	160.00

Well	GR_Matrix (API)	GR_Shale (API)
SPRING GULLY 88	30.00	160.00
SPRING GULLY 9	30.00	160.00
SPRING GULLY 90	30.00	160.00
SPRING GULLY 96	30.00	160.00
STRATHVALE 1	29.05	110.18
SUSSEX DOWNS 1	24.00	124.00
TALLAWALLA 1	19.37	193.25
TAROOM 17	30.00	160.00
TASMANIA 1	24.00	124.00
TAYLOR 6	23.42	129.59
TEATREE 1	24.00	124.00
THRUPP 1	30.22	102.21
TIMOTHY 1	32.22	142.07
TINTAGEL 1	26.67	141.28
TOBY 2	30.64	139.69
TOBY 3	34.46	137.09
TOBY 4	35.40	130.96
TORYBOY 1	27.02	83.10
TRELINGA 1	39.82	139.50
WAAR WAAR 19	13.18	131.75
WAGGAMBA 2	28.44	207.56
WANDOAN 1	39.82	139.50
WAROOBY SOUTH 3	33.97	120.36
WARRIOR 1	29.60	111.04
WASHPOOL 2	30.53	166.30
WEST BRAEMAR 1	23.49	131.75
WEST WANDOAN 1	19.37	193.25
WILLAROO 1	25.00	120.00
WILLOWBE 1	21.91	115.08
WINGNUT 1	27.04	147.20
WINGNUT 2	28.17	154.36
WOLEEBEE CREEK GW4	19.37	193.25
WOODVILLE 1	22.96	171.30
YANCO 1	27.89	137.22
YARRILL CREEK 1	14.65	171.23
YULEBA 1	24.56	148.41

15.3 Appendix 3: Methods and parameters used to calculate porosity

Table 10 Methods used to calculate porosity for UQ-SDAAP wells where "P": is the primary method for porosity calculation. "Y": Indicates that the method was used. Confidence level: 1 is least confident and 4 is most confident.

Well	Controlled by Core Porosity	Neutron Density Method	Density Method	Compressional Slowness Method	Confidence level
ALICK CREEK 1	-	-	-	P	1
ALTON SOUTH 1	-	-	-	P	1
AMOOLEE 1	-	-	-	P	1
ARLINGTON 1	-	-	P	Y	2
AUBURN 1	-	-	-	P	1
BAINBILLA 2	-	-	-	P	1
BALLYMENA 1	-	-	-	P	1
BENNETT 1	Y	-	-	P	2
BENNETT 2	-	-	-	P	1
BENNETT 4	-	-	-	P	1
BENNETT NORTH 1	-	-	-	P	1
BENTLEY 1	-	-	P	Y	2
BOOBERANNA 1	-	-	-	P	1
BOOKOOI 1	-	P	Y	Y	3
BOOROONDOO 1	-	-	-	P	1
BRAEMAR 1	-	-	-	P	1
BRIGALOW CREEK 1	-	-	-	P	1
BULWER 1	-	-	-	P	1
BUNGUNYA 1	-	P	Y	Y	3
BURGOYNE 1	-	P	Y	Y	3
CABAWIN 3	-	P	Y	Y	3
CABAWIN 4	-	-	-	P	1
CANEON 1	-	P	Y	Y	3
CHARLIE GW2	-	P	Y	Y	3
CHARLOTTE GW2	-	P	Y	Y	3
CHESTER 1	-	-	P	Y	2
CHURCHIE 1	-	-	-	P	1
CHURCHIE 11	-	P	Y	Y	3
CHURCHIE 1A	-	P	Y	Y	3
CHURCHIE 2	-	-	-	P	1

Well	Controlled by Core Porosity	Neutron Density Method	Density Method	Compressional Slowness Method	Confidence level
CHURCHIE 3	-	P	Y	Y	3
CHURCHIE 4	-	-	-	P	1
CHURCHIE 5	-	P	Y	Y	3
CHURCHIE 6	-	P	Y	Y	3
CHURCHIE 7	-	P	Y	Y	3
CHURCHIE WEST 1	-	P	Y	Y	3
COALBAH 1	Y	-	-	P	2
COMBABULA 352 MON-P	-	P	Y	Y	3
CONDABRI 13	-	P	Y	-	2
CONDABRI INJ2-P	-	P	Y	-	2
CONDABRI MB9-H	-	P	Y	-	2
CONLOI 1	Y	-	-	P	2
COOCHIEMUDLO GW2	-	P	Y	Y	3
CROWDER NORTH 1	Y	-	-	P	2
DAVIDSON 1	-	-	-	P	1
DAYDREAM 1	-	P	Y	Y	3
DEVONDALE 1	-	P	Y	Y	3
DILBONG 1	-	-	-	P	1
DULACCA 1	-	-	-	P	1
DURHAM DEEP 1	-	P	Y	Y	3
DURHAM RANCH 1	-	-	-	P	1
DURHAM RANCH 11	-	-	-	P	1
DURHAM RANCH 12	-	P	Y	-	2
DURHAM RANCH 13	-	-	P	-	1
DURHAM RANCH 15	-	-	-	P	1
DURHAM RANCH 18	-	-	-	P	1
DURHAM RANCH 20	-	-	P	-	1
DURHAM RANCH 21	-	-	-	P	1
DURHAM RANCH 23	-	P	Y	-	2
DURHAM RANCH 29	-	-	P	Y	2
DURHAM RANCH 37	-	-	P	-	1
DURHAM RANCH 42	-	-	P	-	1
DURHAM RANCH 61	-	P	Y	Y	3

Well	Controlled by Core Porosity	Neutron Density Method	Density Method	Compressional Slowness Method	Confidence level
DURHAM RANCH 62	-	-	P	-	1
DURHAM RANCH 91	-	-	P	-	1
DURHAM RANCH 92	-	-	P	-	1
DURHAM RANCH 97	-	-	P	-	1
EDENDALE 1	-	P	Y	Y	3
FAIRYMOUNT 1	-	P	Y	Y	3
FANTOME 1	-	P	Y	Y	3
FERRETT 1	-	-	-	P	1
FORKES CREEK 1	-	P	Y	Y	3
FORMOSA DOWNS 1	-	P	Y	Y	3
FRENEAU 1	-	P	Y	Y	3
GAMBIER PARK 1	-	P	Y	Y	3
GARAH 1	-	-	-	P	1
GIDDI GIDDI 1	-	-	-	P	1
GILGAI 1	-	-	-	P	1
GLEN 1	-	P	Y	Y	3
GRAIL NORTH 1	-	P	Y	Y	3
GUMS 1	-	P	Y	Y	3
GURULMUNDI 1	-	-	-	P	1
HALFMOON 1	-	P	Y	Y	3
HAYES CREEK 1	-	-	-	P	1
HEIDI 1	-	-	-	P	1
HERMITAGE 1	-	P	Y	Y	3
HOADLEYS 1	-	P	Y	Y	3
HORSESHOE 1	-	P	Y	Y	3
HORSESHOE 2	-	P	Y	Y	3
HUMBUG CREEK 1	-	-	-	P	1
HUMBUG CREEK 2	-	-	-	P	1
IMINBAH 1	Y	-	-	P	2
KEGGABILLA 1	-	-	P	Y	2
KENYA EAST GW7	Y	P	Y	Y	4
KINKABILLA CREEK 1	-	-	-	P	1
KOGAN SOUTH 1	Y	-	-	P	2
LAWSON 1	-	-	-	P	1

Well	Controlled by Core Porosity	Neutron Density Method	Density Method	Compressional Slowness Method	Confidence level
LEICHHARDT 1	-	-	-	P	1
MAXIMA 1	-	-	-	P	1
MAXIMA MAX 1	-	-	-	P	1
MEANDARRA 1	Y	-	-	P	2
MENTOR 1	-	-	-	P	1
MERRIT 1	Y	P	Y	Y	4
MILES 1	-	P	Y	Y	3
MILGARRA 1	-	P	Y	Y	3
MINDAGABIE 1	Y	P	Y	Y	4
MOONIE 16	Y	-	-	P	2
MOONIE 21	Y	-	-	P	2
MOONIE 23	Y	-	-	P	2
MOONIE 24	Y	-	-	P	2
MOONIE 25	Y	-	-	P	2
MOONIE 27	Y	-	-	P	2
MOONIE 28	Y	-	-	P	2
MOONIE 31	Y	-	P	Y	3
MOONIE 33	Y	P	Y	Y	4
MOONIE 34	Y	-	P	Y	3
MOONIE 36	Y	-	P	Y	3
MOONIE 37	Y	-	-	P	2
MOONIE 38	Y	-	-	P	2
MOONIE 39	-	-	P	Y	2
MOONIE 40	-	P	Y	-	2
MOONIE 41	-	P	Y	Y	3
MOONIE 42	-	P	Y	Y	3
MOONIE 43	-	-	P	Y	2
MOONIE 44	-	-	P	Y	2
MURILLA 1	-	-	-	P	1
MYALL CREEK 3	-	-	-	P	1
MYALL CREEK 4	-	-	-	P	1
MYALL CREEK 6	-	-	-	P	1
MYALL CREEK 7	-	P	Y	Y	3
MYALL CREEK 8	-	-	-	P	1
MYALL CREEK 9	-	P	Y	Y	3

Well	Controlled by Core Porosity	Neutron Density Method	Density Method	Compressional Slowness Method	Confidence level
MYALL CREEK EAST 1	-	P	Y	Y	3
NAMARAH 6	-	P	Y	Y	3
NOMBY 1	Y	-	-	P	2
NOORINDOO 2	-	-	-	P	1
NORKAM 1	-	P	Y	Y	3
NORTH CHERWONDAH 1	-	-	-	P	1
OGILVIE CREEK 1	-	P	Y	Y	3
OGILVIE CREEK 2	-	P	Y	Y	3
OVERSTON 1	-	P	Y	Y	3
PALOMA 1	-	-	-	P	1
PARKNOOK 3	-	P	Y	Y	3
PEAT 12	-	P	Y	Y	3
PEAT 15	-	-	P	Y	2
PEAT 27	-	-	P	-	1
PEAT 32	-	-	P	-	1
PINE HILLS 7	-	P	Y	Y	3
PINEVIEW 1	Y	P	Y	Y	4
REDBANK 1	-	-	-	P	1
REEDY CREEK INJ2-P	-	P	Y	-	2
REEDY CREEK INJ4-P	-	P	Y	-	2
REEDY CREEK MB3-H	-	P	Y	Y	3
RIDGEWOOD 6	-	P	Y	Y	3
RIVERSIDE 1	-	P	Y	Y	3
RIVERSIDE SOUTH 1	-	-	-	P	1
ROCKFERN 1	-	P	Y	Y	3
ROCKWOOD 2	Y	-	-	P	2
SCOTIA 16	-	-	P	Y	2
SCOTIA 20	-	-	P	Y	2
SCOTIA 6	-	-	-	P	1
SCOTIA 9	-	P	Y	Y	3
SLATEHILL 1	-	P	Y	Y	3

Well	Controlled by Core Porosity	Neutron Density Method	Density Method	Compressional Slowness Method	Confidence level
SOUTH BURUNGA 1	-	-	-	P	1
SPRING GULLY 10	-	-	P	-	1
SPRING GULLY 115	-	-	P	-	1
SPRING GULLY 16	-	P	Y	Y	3
SPRING GULLY 19	-	-	P	-	1
SPRING GULLY 22	-	P	Y	Y	3
SPRING GULLY 27	-	-	P	Y	2
SPRING GULLY 30	-	-	P	-	1
SPRING GULLY 33	-	-	P	-	1
SPRING GULLY 36	-	-	P	Y	2
SPRING GULLY 38	-	-	P	-	1
SPRING GULLY 40	-	-	P	-	1
SPRING GULLY 45	-	-	P	-	1
SPRING GULLY 54	-	-	P	-	1
SPRING GULLY 57	-	-	P	-	1
SPRING GULLY 58	-	-	P	-	1
SPRING GULLY 59	-	-	P	-	1
SPRING GULLY 61	-	-	-	P	1
SPRING GULLY 65	-	-	P	-	1
SPRING GULLY 66	-	-	P	-	1
SPRING GULLY 7	-	-	P	-	1
SPRING GULLY 88	-	-	P	-	1
SPRING GULLY 9	-	-	P	-	1
SPRING GULLY 90	-	-	P	-	1
SPRING GULLY 96	-	-	P	-	1
SUSSEX DOWNS 1	-	-	-	P	1
TALLAWALLA 1	-	-	-	P	1
TAROOM 17	Y	-	-	P	2
TASMANIA 1	-	P	Y	Y	3
TEATREE 1	-	P	Y	Y	3
TIMOTHY 1	-	-	-	P	1
TOBY 2	-	-	-	P	1
TOBY 3	-	P	Y	Y	3
TOBY 4	-	-	-	P	1
TRELINGA 1	Y	P	Y	Y	4

Well	Controlled by Core Porosity	Neutron Density Method	Density Method	Compressional Slowness Method	Confidence level
WAAR WAAR 19	-	P	Y	Y	3
WAGGAMBA 2	-	P	Y	Y	3
WEST BRAEMAR 1	-	-	P	Y	2
WEST WANDOAN 1	Y	P	Y	Y	4
WILLAROO 1	-	P	Y	Y	3
WILLOWBE 1	Y	-	-	P	2
WOLEEBEE CREEK GW4	Y	P	Y	Y	4
WOODVILLE 1	-	-	P	Y	2
YARRILL CREEK 1	-	-	-	P	1

Table 11 Parameters used to calculate porosity from neutron-density.

Well	RHOB wet shale (g/cc)	RHOB dry shale (g/cc)	NPHI_shale (v/v)
BOOKOOI 1	2.59	2.71	0.35
BURGOYNE 1	2.448	2.59	0.4
CABAWIN 3	2.52	2.64	0.383
CANEON 1	2.448	2.59	0.4
CHARLIE GW2	2.448	2.59	0.4
CHARLOTTE GW2	2.448	2.59	0.4
CHURCHIE 11	2.59	2.71	0.35
CHURCHIE 1A	2.59	2.71	0.35
CHURCHIE 3	2.65	2.71	0.33
CHURCHIE 5	2.59	2.71	0.35
CHURCHIE 6	2.59	2.71	0.35
CHURCHIE 7	2.59	2.71	0.365
CHURCHIE WEST 1	2.59	2.71	0.35
COMBABULA 352 MON-P	2.448	2.59	0.4
CONDABRI 13	2.448	2.59	0.4
CONDABRI INJ2-P	2.448	2.59	0.4
CONDABRI MB9-H	2.448	2.59	0.4
COOCHIEMUDLO GW2	2.448	2.59	0.4
DAYDREAM 1	2.59	2.71	0.35
DEVONDALE 1	2.51	2.64	0.27
DURHAM DEEP 1	2.448	2.59	0.4
DURHAM RANCH 12	2.448	2.59	0.4
DURHAM RANCH 23	2.448	2.59	0.4
DURHAM RANCH 61	2.448	2.59	0.4
FAIRYMOUNT 1	2.45	2.64	0.365
FANTOME 1	2.53	2.64	0.23
FORKES CREEK 1	2.609	2.64	0.222
FORMOSA DOWNS 1	2.6	2.64	0.329
FRENEAU 1	2.58	2.64	0.294
GLEN 1	2.53	2.64	0.23
GRAIL NORTH 1	2.57	2.64	0.247
GUMS 1	2.52	2.64	0.25
HALFMOON 1	2.51	2.64	0.26
HERMITAGE 1	2.448	2.59	0.4

Well	RHOB wet shale (g/cc)	RHOB dry shale (g/cc)	NPHI_shale (v/v)
HOADLEYS 1	2.62	2.64	0.233
HORSESHOE 1	2.59	2.71	0.32
HORSESHOE 2	2.59	2.71	0.35
KENYA EAST GW7	2.448	2.59	0.4
MERRIT 1	2.63	2.78	0.324
MILES 1	2.448	2.59	0.4
MILGARRA 1	2.53	2.64	0.23
MINDAGABIE 1	2.51	2.64	0.385
MOONIE 33	2.505	2.75	0.45
MOONIE 40	2.515	2.75	0.249
MOONIE 41	2.456	2.75	0.307
MOONIE 42	2.55	2.75	0.29
MYALL CREEK 7	2.59	2.71	0.3278
MYALL CREEK 9	2.59	2.71	0.35
MYALL CREEK EAST 1	2.59	2.71	0.335
NAMARAH 6	2.52	2.64	0.24
NORKAM 1	2.6	2.71	0.335
OGILVIE CREEK 1	2.59	2.71	0.35
OGILVIE CREEK 2	2.59	2.71	0.35
OVERSTON 1	2.62	2.71	0.335
PARKNOOK 3	2.61	2.64	0.359
PEAT 12	2.448	2.59	0.4
PINE HILLS 7	2.448	2.59	0.4
PINEVIEW 1	2.448	2.59	0.4
REEDY CREEK INJ2-P	2.448	2.59	0.4
REEDY CREEK INJ4-P	2.448	2.59	0.4
REEDY CREEK MB3-H	2.448	2.59	0.4
RIDGEWOOD 6	2.43	2.64	0.336
RIVERSIDE 1	2.61	2.71	0.342
SCOTIA 9	2.448	2.59	0.4
SLATEHILL 1	2.448	2.59	0.4
SPRING GULLY 16	2.448	2.59	0.4
SPRING GULLY 22	2.448	2.59	0.4
TASMANIA 1	2.53	2.64	0.23
TEATREE 1	2.51	2.64	0.27
TOBY 3	2.42	2.64	0.402

Well	RHOB wet shale (g/cc)	RHOB dry shale (g/cc)	NPHI_shale (v/v)
TRELINGA 1	2.448	2.59	0.4
WAAR WAAR 19	2.5	2.64	0.29
WAGGAMBA 2	2.63	2.64	0.293
WEST WANDOAN 1	2.448	2.59	0.4
WILLAROO 1	2.51	2.64	0.26
WOLEEBEE CREEK GW4	2.448	2.59	0.4
WOODVILLE 1	2.53	2.64	0.23

Table 12 Parameters used to calculate porosity from density.

Well	Core Porosity	RHO_MATRIX (g/cc)	RHO_SHALE (g/cc)	RHO_FLUID (g/cc)	PHI_SHALE (v/v)	POR_IS (v/v)	POR_COAL (v/v)
ARLINGTON 1	-	2.65	2.64	1	0.069	0	0
BENTLEY 1	-	2.65	2.64	1	0.076	0	0
BOOKOOI 1	-	2.65	2.71	1	0.07	0	0
BUNGUNYA 1	-	2.65	2.64	1	0.07	0	0
BURGOYNE 1	-	2.65	2.59	1	0.089	0	0
CABAWIN 3	-	2.65	2.64	1	0.074	0	0
CANEON 1	-	2.65	2.59	1	0.089	0	0
CHARLIE GW2	-	2.65	2.59	1	0.089	0	0
CHARLOTTE GW2	-	2.65	2.59	1	0.089	0	0
CHESTER 1	-	2.65	2.64	1	0.07	0	0
CHURCHIE 11	-	2.65	2.71	1	0.07	0	0
CHURCHIE 1A	-	2.65	2.71	1	0.07	0	0
CHURCHIE 3	-	2.65	2.71	1	0.037	0	0
CHURCHIE 5	-	2.65	2.71	1	0.07	0	0
CHURCHIE 6	-	2.65	2.71	1	0.07	0	0
CHURCHIE 7	-	2.65	2.71	1	0.07	0	0
CHURCHIE WEST 1	-	2.65	2.71	1	0.07	0	0
COMBABULA 352 MON-P	-	2.65	2.59	1	0.089	0	0
CONDABRI 13	-	2.65	2.59	1	0.089	0	0
CONDABRI INJ2-P	-	2.65	2.59	1	0.089	0	0
CONDABRI MB9-H	-	2.65	2.59	1	0.089	0	0
COOCHIEMUDLO GW2	-	2.65	2.59	1	0.089	0	0
DAYDREAM 1	-	2.65	2.71	1	0.07	0	0
DEVONDALE 1	-	2.65	2.64	1	0.079	0	0
DURHAM DEEP 1	-	2.65	2.59	1	0.089	0	0
DURHAM RANCH 12	-	2.65	2.59	1	0.089	0	0
DURHAM RANCH 13	-	2.65	2.59	1	0.089	0	0
DURHAM RANCH 20	-	2.65	2.59	1	0.089	0	0
DURHAM RANCH 23	-	2.65	2.59	1	0.089	0	0
DURHAM RANCH 29	-	2.65	2.59	1	0.089	0	0
DURHAM RANCH 37	-	2.65	2.59	1	0.089	0	0

Well	Core Porosity	RHO_MATRIX (g/cc)	RHO_SHALE (g/cc)	RHO_FLUID (g/cc)	PHI_SHALE (v/v)	POR_IS (v/v)	POR_COAL (v/v)
DURHAM RANCH 42	-	2.65	2.59	1	0.089	0	0
DURHAM RANCH 61	-	2.65	2.59	1	0.089	0	0
DURHAM RANCH 62	-	2.65	2.59	1	0.089	0	0
DURHAM RANCH 91	-	2.65	2.59	1	0.089	0	0
DURHAM RANCH 92	-	2.65	2.59	1	0.089	0	0
DURHAM RANCH 97	-	2.65	2.59	1	0.089	0	0
FAIRYMOUNT 1	-	2.65	2.64	1	0.116	0	0
FANTOME 1	-	2.65	2.64	1	0.07	0	0
FORKES CREEK 1	-	2.65	2.64	1	0.02	0	0
FORMOSA DOWNS 1	-	2.65	2.64	1	0.024	0	0
FRENEAU 1	-	2.65	2.64	1	0.037	0	0
GAMBIER PARK 1	-	2.65	2.71	1	0.07	0	0
GLEN 1	-	2.65	2.64	1	0.067	0	0
GRAIL NORTH 1	-	2.65	2.64	1	0.043	0	0
GUMS 1	-	2.65	2.64	1	0.074	0	0
HALFMOON 1	-	2.65	2.64	1	0.079	0	0
HERMITAGE 1	-	2.65	2.59	1	0.089	0	0
HOADLEYS 1	-	2.65	2.64	1	0.012	0	0
HORSESHOE 1	-	2.65	2.71	1	0.07	0	0
HORSESHOE 2	-	2.65	2.71	1	0.07	0	0
KEGGABILLA 1	-	2.65	2.64	1	0.07	0	0
KENYA EAST GW7	Y	2.65	2.59	1	0.089	0	0
MILES 1	-	2.65	2.59	1	0.089	0	0
MILGARRA 1	-	2.65	2.64	1	0.067	0	0
MINDAGABIE 1	Y	2.65	2.64	1	0.079	0	0
MOONIE 31	Y	2.65	2.545	1	0.1172	0	0
MOONIE 33	Y	2.65	2.505	1	0.14	0	0
MOONIE 34	Y	2.65	2.505	1	0.14	0	0
MOONIE 36	Y	2.65	2.505	1	0.14	0	0
MOONIE 39	-	2.65	2.521	1	0.1309	0	0
MOONIE 40	-	2.65	2.515	1	0.1343	0	0
MOONIE 41	-	2.65	2.456	1	0.168	0	0

Well	Core Porosity	RHO_MATRIX (g/cc)	RHO_SHALE (g/cc)	RHO_FLUID (g/cc)	PHI_SHALE (v/v)	POR_IS (v/v)	POR_COAL (v/v)
MOONIE 42	-	2.65	2.55	1	0.1145	0	0
MOONIE 43	-	2.65	2.504	1	0.141	0	0
MOONIE 44	-	2.65	2.46	1	0.1658	0	0
MYALL CREEK 7	-	2.65	2.71	1	0.07	0	0
MYALL CREEK 9	-	2.65	2.71	1	0.07	0	0
MYALL CREEK EAST 1	-	2.65	2.71	1	0.07	0	0
NAMARAH 6	-	2.65	2.64	1	0.074	0	0
NORKAM 1	-	2.65	2.71	1	0.064	0	0
OGILVIE CREEK 1	-	2.65	2.71	1	0.07	0	0
OGILVIE CREEK 2	-	2.65	2.71	1	0.07	0	0
OVERSTON 1	-	2.65	2.71	1	0.053	0	0
PARKNOOK 3	-	2.65	2.64	1	0.018	0	0
PEAT 12	-	2.65	2.59	1	0.089	0	0
PEAT 15	-	2.65	2.59	1	0.089	0	0
PEAT 27	-	2.65	2.59	1	0.089	0	0
PEAT 32	-	2.65	2.59	1	0.089	0	0
PINE HILLS 7	-	2.65	2.59	1	0.089	0	0
PINEVIEW 1	Y	2.65	2.59	1	0.089	0	0
REEDY CREEK INJ2-P	-	2.65	2.59	1	0.089	0	0
REEDY CREEK INJ4-P	-	2.65	2.59	1	0.089	0	0
REEDY CREEK MB3-H	-	2.65	2.59	1	0.089	0	0
RIDGEWOOD 6	-	2.65	2.64	1	0.128	0	0
RIVERSIDE 1	-	2.65	2.71	1	0.058	0	0
ROCKFERN 1	-	2.65	2.64	1	0.07	0	0
SCOTIA 16	-	2.65	2.59	1	0.089	0	0
SCOTIA 20	-	2.65	2.59	1	0.089	0	0
SCOTIA 9	-	2.65	2.59	1	0.089	0	0
SLATEHILL 1	-	2.65	2.59	1	0.089	0	0
SPRING GULLY 10	-	2.65	2.59	1	0.089	0	0
SPRING GULLY 115	-	2.65	2.59	1	0.089	0	0
SPRING GULLY 16	-	2.65	2.59	1	0.089	0	0
SPRING GULLY 19	-	2.65	2.59	1	0.089	0	0

Well	Core Porosity	RHO_MATRIX (g/cc)	RHO_SHALE (g/cc)	RHO_FLUID (g/cc)	PHI_SHALE (v/v)	POR_IS (v/v)	POR_COAL (v/v)
SPRING GULLY 22	-	2.65	2.59	1	0.089	0	0
SPRING GULLY 27	-	2.65	2.59	1	0.089	0	0
SPRING GULLY 30	-	2.65	2.59	1	0.089	0	0
SPRING GULLY 33	-	2.65	2.59	1	0.089	0	0
SPRING GULLY 36	-	2.65	2.59	1	0.089	0	0
SPRING GULLY 38	-	2.65	2.59	1	0.089	0	0
SPRING GULLY 40	-	2.65	2.59	1	0.089	0	0
SPRING GULLY 45	-	2.65	2.59	1	0.089	0	0
SPRING GULLY 54	-	2.65	2.59	1	0.089	0	0
SPRING GULLY 57	-	2.65	2.59	1	0.089	0	0
SPRING GULLY 58	-	2.65	2.59	1	0.089	0	0
SPRING GULLY 59	-	2.65	2.59	1	0.089	0	0
SPRING GULLY 65	-	2.65	2.59	1	0.089	0	0
SPRING GULLY 66	-	2.65	2.59	1	0.089	0	0
SPRING GULLY 7	-	2.65	2.59	1	0.089	0	0
SPRING GULLY 88	-	2.65	2.59	1	0.089	0	0
SPRING GULLY 9	-	2.65	2.59	1	0.089	0	0
SPRING GULLY 90	-	2.65	2.59	1	0.089	0	0
SPRING GULLY 96	-	2.65	2.59	1	0.089	0	0
TASMANIA 1	-	2.65	2.64	1	0.067	0	0
TEATREE 1	-	2.65	2.64	1	0.079	0	0
TOBY 3	-	2.65	2.64	1	0.134	0	0
TRELINGA 1	Y	2.65	2.59	1	0.089	0	0
WAAR WAAR 19	-	2.65	2.64	1	0.085	0	0
WAGGAMBA 2	-	2.65	2.64	1	0.006	0	0
WEST BRAEMAR 1	-	2.65	2.64	1	0.07	0	0
WEST WANDOAN 1	Y	2.65	2.59	1	0.089	0	0
WILLAROO 1	-	2.65	2.64	1	0.079	0	0
WOLEEBEE CREEK GW4	Y	2.65	2.59	1	0.089	0	0
WOODVILLE 1	-	2.65	2.64	1	0.07	0	0

Table 13 Parameters used to calculate porosity from compressional slowness.

Well	Core Porosity	PHI_SHALE (v/v)	DT_MATRIX (µs/ft)	DT_FLUID (µs/ft)	Cp (unitless)	DT_DRY_SHALE (µs/ft)	POR_IS (v/v)	POR_COAL (v/v)
ALICK CREEK 1	-	0.07	50	189	1	72	0	0
ALTON SOUTH 1	-	0.145	50	189	1	57	0	0
AMOOLEE 1	-	0.089	55.5	189	0.789	82.5	0	0
AUBURN 1	-	0.089	55.5	189	0.789	82.5	0	0
BAINBILLA 2	-	0.1658	55.5	189	1	71.46	0	0
BALLYMENA 1	-	0.145	50	189	1	55	0	0
BENNETT 1	Y	0.07	50	189	1	69	0	0
BENNETT 2	-	0.07	50	189	1	69	0	0
BENNETT 4	-	0.07	50	189	1	70	0	0
BENNETT NORTH 1	-	0.07	50	189	1	70	0	0
BOOBERANNA 1	-	0.145	50	189	1	56	0	0
BOOKOOI 1	-	0.07	55	189	1	67	0	0
BOOROONDOO 1	-	0.07	55	189	1	69	0	0
BRAEMAR 1	-	0.07	50	189	1	74	0	0
BRIGALOW CREEK 1	-	0.07	55	189	1	71	0	0
BULWER 1	-	0.081	55.5	189	0.782	82.5	0	0
BURGOYNE 1	-	0.089	55.5	189	0.789	82.5	0	0
CABAWIN 4	-	0.07	50	189	1	68	0	0
CANEON 1	-	0.089	55.5	189	0.789	82.5	0	0
CHARLIE GW2	-	0.089	55.5	189	0.789	82.5	0	0
CHARLOTTE GW2	-	0.089	55.5	189	0.789	82.5	0	0
CHURCHIE 1	-	0.07	55	189	1	66	0	0
CHURCHIE 11	-	0.07	55	189	1	66	0	0
CHURCHIE 1A	-	0.07	55	189	1	66	0	0
CHURCHIE 2	-	0.07	55	189	1	66	0	0
CHURCHIE 3	-	0.037	55	189	1	70	0	0
CHURCHIE 4	-	0.07	55	189	1	66	0	0
CHURCHIE 5	-	0.07	55	189	1	66	0	0
CHURCHIE 6	-	0.07	55	189	1	66	0	0
CHURCHIE 7	-	0.07	55	189	1	66	0	0
CHURCHIE WEST 1	-	0.07	55	189	1	66	0	0

Well	Core Porosity	PHI_SHALE (v/v)	DT_MATRIX (µs/ft)	DT_FLUID (µs/ft)	Cp (unitless)	DT_DRY_SHALE (µs/ft)	POR_IS (v/v)	POR_COAL (v/v)
COALBAH 1	Y	0.07	50	189	1	64.64	0	0
COMBABULA 352 MON-P	-	0.089	55.5	189	0.789	82.5	0	0
CONLOI 1	Y	0.07	50	189	1	63.6	0	0
COOCHIEMUDLO GW2	-	0.089	55.5	189	0.789	82.5	0	0
CROWDER NORTH 1	Y	0.07	55	189	1	70.78	0	0
DAVIDSON 1	-	0.07	50	189	1	67	0	0
DAYDREAM 1	-	0.07	55	189	1	61	0	0
DILBONG 1	-	0.07	55	189	1	69	0	0
DULACCA 1	-	0.089	55.5	189	0.789	82.5	0	0
DURHAM DEEP 1	-	0.089	55.5	189	0.789	82.5	0	0
DURHAM RANCH 1	-	0.089	55.5	189	0.789	82.5	0	0
DURHAM RANCH 11	-	0.089	55.5	189	0.789	82.5	0	0
DURHAM RANCH 15	-	0.089	55.5	189	0.789	82.5	0	0
DURHAM RANCH 18	-	0.089	55.5	189	0.789	82.5	0	0
DURHAM RANCH 21	-	0.089	55.5	189	0.789	82.5	0	0
DURHAM RANCH 29	-	0.089	55.5	189	0.789	82.5	0	0
DURHAM RANCH 61	-	0.089	55.5	189	0.789	82.5	0	0
EDENDALE 1	-	0.145	50	189	1	61	0	0
FANTOME 1	-	0.07	50	189	0.9	65.5	0	0
FERRETT 1	-	0.081	55.5	189	0.782	82.5	0	0
GAMBIER PARK 1	-	0.07	55	189	1	67	0	0
GARAH 1	-	0.145	50	189	1	64	0	0
GIDDI GIDDI 1	-	0.145	50	189	1	58	0	0
GILGAI 1	-	0.07	55	189	1	69	0	0
GURULMUNDI 1	-	0.089	55.5	189	0.789	82.5	0	0
HAYES CREEK 1	-	0.07	55	189	1	65	0	0
HEIDI 1	-	0.145	50	189	1	59	0	0
HERMITAGE 1	-	0.089	55.5	189	0.789	82.5	0	0
HORSESHOE 1	-	0.07	55	189	1	67	0	0
HORSESHOE 2	-	0.07	55	189	1	67	0	0
HUMBUG CREEK 1	-	0.07	50	189	1	69	0	0

Well	Core Porosity	PHI_SHALE (v/v)	DT_MATRIX (µs/ft)	DT_FLUID (µs/ft)	Cp (unitless)	DT_DRY_SHALE (µs/ft)	POR_IS (v/v)	POR_COAL (v/v)
HUMBUG CREEK 2	-	0.07	50	189	1	70	0	0
IMINBAH 1	Y	0.07	55	189	1	70.87	0	0
KENYA EAST GW7	Y	0.089	55.5	189	0.789	82.5	0	0
KINKABILLA CREEK 1	-	0.07	55	189	1	65	0	0
KOGAN SOUTH 1	Y	0.07	50	189	1	76.43	0	0
LAWSON 1	-	0.07	50	189	1	71	0	0
LEICHHARDT 1	-	0.07	50	189	1	69	0	0
MAXIMA 1	-	0.145	50	189	1	58	0	0
MAXIMA MAX 1	-	0.145	50	189	1	58	0	0
MEANDARRA 1	Y	0.07	50	189	1	64	0	0
MENTOR 1	-	0.07	55	189	1	67	0	0
MILES 1	-	0.089	55.5	189	0.789	82.5	0	0
MINDAGABIE 1	Y	0.07	55	189	1	71.65	0	0
MOONIE 16	Y	0.14	55.5	189	1	60	0	0
MOONIE 21	Y	0.14	55.5	189	1	71.43	0	0
MOONIE 23	Y	0.14	55.5	189	1	60	0	0
MOONIE 24	Y	0.14	55.5	189	1	60	0	0
MOONIE 25	Y	0.14	55.5	189	1	60	0	0
MOONIE 27	Y	0.14	55.5	189	1	71.46	0	0
MOONIE 28	Y	0.14	55.5	189	1	71.46	0	0
MOONIE 31	Y	0.1172	55.5	189	1	71.46	0	0
MOONIE 33	Y	0.14	55.5	189	1	71.46	0	0
MOONIE 34	Y	0.14	55.5	189	1	71.46	0	0
MOONIE 36	Y	0.14	55.5	189	1	71.46	0	0
MOONIE 37	Y	0.14	55.5	189	1	71.46	0	0
MOONIE 38	Y	0.14	55.5	189	1	71.46	0	0
MOONIE 39	-	0.1309	55.5	189	1	71.46	0	0
MOONIE 41	-	0.1343	55.5	189	1	71.46	0	0
MOONIE 42	-	0.168	55.5	189	1	71.46	0	0
MOONIE 43	-	0.1145	55.5	189	1	71.46	0	0
MOONIE 44	-	0.141	50	189	1	71.46	0	0

Well	Core Porosity	PHI_SHALE (v/v)	DT_MATRIX (µs/ft)	DT_FLUID (µs/ft)	Cp (unitless)	DT_DRY_SHALE (µs/ft)	POR_IS (v/v)	POR_COAL (v/v)
MURILLA 1	-	0.07	55	189	1	69	0	0
MYALL CREEK 3	-	0.07	55	189	1	67	0	0
MYALL CREEK 4	-	0.07	55	189	1	66	0	0
MYALL CREEK 6	-	0.07	55	189	1	66	0	0
MYALL CREEK 7	-	0.07	55	189	1	66	0	0
MYALL CREEK 8	-	0.07	55	189	1	67	0	0
MYALL CREEK 9	-	0.07	55	189	1	67	0	0
MYALL CREEK EAST 1	-	0.07	55	189	1	66	0	0
NOMBY 1	Y	0.16	50	189	1	59.28	0	0
NOORINDOO 2	-	0.07	55	189	1	66	0	0
NORKAM 1	-	0.064	55	189	1	66	0	0
NORTH CHERWONDAH 1	-	0.089	55.5	189	0.789	82.5	0	0
OGILVIE CREEK 1	-	0.07	55	189	1	67	0	0
OGILVIE CREEK 2	-	0.07	55	189	1	67	0	0
OVERSTON 1	-	0.053	55	189	1	67	0	0
PALOMA 1	-	0.07	50	189	1	64	0	0
PEAT 12	-	0.089	55.5	189	0.789	82.5	0	0
PEAT 15	-	0.089	55.5	189	0.789	82.5	0	0
PINE HILLS 7	-	0.089	55.5	189	0.789	82.5	0	0
PINEVIEW 1	Y	0.089	55.5	189	0.789	82.5	0	0
REDBANK 1	-	0.145	50	189	1	59	0	0
REEDY CREEK MB3-H	-	0.089	55.5	189	0.789	82.5	0	0
RIVERSIDE 1	-	0.058	55	189	1	68	0	0
RIVERSIDE SOUTH 1	-	0.07	55	189	1	66	0	0
ROCKWOOD 2	Y	0.07	50	189	1	76.49	0	0
SCOTIA 16	-	0.089	55.5	189	0.789	82.5	0	0
SCOTIA 20	-	0.089	55.5	189	0.789	82.5	0	0
SCOTIA 6	-	0.089	55.5	189	0.789	82.5	0	0
SCOTIA 9	-	0.089	55.5	189	0.789	82.5	0	0
SLATEHILL 1	-	0.089	55.5	189	0.789	82.5	0	0
SOUTH BURUNGA 1	-	0.089	55.5	189	0.789	82.5	0	0

Well	Core Porosity	PHI_SHALE (v/v)	DT_MATRIX (µs/ft)	DT_FLUID (µs/ft)	Cp (unitless)	DT_DRY_SHALE (µs/ft)	POR_IS (v/v)	POR_COAL (v/v)
SPRING GULLY 16	-	0.089	55.5	189	0.789	82.5	0	0
SPRING GULLY 22	-	0.089	55.5	189	0.789	82.5	0	0
SPRING GULLY 27	-	0.089	55.5	189	0.789	82.5	0	0
SPRING GULLY 36	-	0.089	55.5	189	0.789	82.5	0	0
SPRING GULLY 61	-	0.089	55.5	189	0.789	82.5	0	0
SUSSEX DOWNS 1	-	0.07	55	189	1	65	0	0
TALLAWALLA 1	-	0.089	55.5	189	0.789	82.5	0	0
TAROOM 17	Y	0.089	55.5	189	0.789	82.5	0	0
TIMOTHY 1	-	0.145	50	189	1	57	0	0
TOBY 2	-	0.145	50	189	1	67	0	0
TOBY 4	-	0.145	50	189	1	69	0	0
TRELINGA 1	Y	0.089	55.5	189	0.789	82.5	0	0
WEST WANDOAN 1	Y	0.089	55.5	189	0.789	82.5	0	0
WILLOWBE 1	Y	0.13	50	189	1	62.94	0	0
WOLEEBEE CREEK GW4	Y	0.089	55.5	189	0.789	82.5	0	0
YARRILL CREEK 1	-	0.145	50	189	1	69	0	0

15.4 Appendix 4: Summary and maps of petrophysical properties

Table 14 Summary of the petrophysical properties interpreted for the UQ SDAAP.

Well	Blocky Sandstone Reservoir				J10/TS1 to MFS1				MFS1 to SB2				SB2 to TS3				Ultimate Seal			
	Ave. V_{shale} (v/v)	Ave. PHIT (v/v)	Ave. PHIE (v/v)	Ave. PERM (mD)	Ave. V_{shale} (v/v)	Ave. PHIT (v/v)	Ave. PHIE (v/v)	Ave. PERM (mD)	Ave. V_{shale} (v/v)	Ave. PHIT (v/v)	Ave. PHIE (v/v)	Ave. PERM (mD)	Ave. V_{shale} (v/v)	Ave. PHIT (v/v)	Ave. PHIE (v/v)	Ave. PERM (mD)	Ave. V_{shale} (v/v)	Ave. PHIT (v/v)	Ave. PHIE (v/v)	Ave. PERM (mD)
ALICK CREEK 1	0.363	0.124	0.088	-	0.524	0.139	0.068	-	0.566	0.188	0.089	-	0.492	0.172	0.084	-	0.421	0.219	0.130	-
ALTON SOUTH 1	-	-	-	-	-	-	-	-	-	-	-	-	0.355	0.143	0.110	-	0.413	0.143	0.101	-
AMOOLEE 1	0.299	0.075	0.057	14.000	0.219	0.129	0.101	92.00	0.324	0.111	0.074	0.16	0.284	0.174	0.124	160.00	0.306	0.147	0.101	210.00
ARLINGTON 1	0.185	0.120	0.110	110.000	0.741	0.065	0.020	<0.01	0.811	0.088	0.035	25.00	0.694	0.092	0.049	190.00	0.731	0.089	0.041	0.02
AUBURN 1	0.057	0.165	0.162	290.000	0.453	0.069	0.040	2.40	0.541	0.148	0.064	64.00	0.465	0.119	0.062	3.00	0.413	0.146	0.087	820.00
AVONDALE 4	-	-	-	-	-	-	-	-	0.413	-	-	-	0.588	-	-	-	0.560	-	-	-
BAINBILLA 2	-	-	-	-	0.441	0.149	0.083	-	0.593	0.221	0.086	-	0.558	0.180	0.076	-	0.610	0.194	0.078	-
BALLAROO 1	-	-	-	-	-	-	-	-	0.329	-	-	-	0.427	-	-	-	0.546	-	-	-
BALLYMENA 1	0.146	0.173	0.149	-	0.813	0.138	0.026	-	0.841	0.141	0.023	-	0.612	0.205	0.079	-	0.513	0.206	0.100	-
BEAUFORT 6	-	-	-	-	0.398	-	-	-	0.602	-	-	-	0.581	-	-	-	0.577	-	-	-
BELBRI 2	-	-	-	-	0.497	-	-	-	0.493	-	-	-	0.711	-	-	-	0.679	-	-	-
BENGALLA 1	-	-	-	-	0.412	-	-	-	0.605	-	-	-	0.391	-	-	-	0.404	-	-	-
BENNETT 1	0.126	0.166	0.153	22.000	0.577	0.098	0.051	1100.00	0.740	0.151	0.038	0.36	0.584	0.152	0.064	1000.00	0.583	0.183	0.079	950.00
BENNETT 2	0.136	0.177	0.158	79.000	0.674	0.094	0.038	35.00	0.639	0.170	0.058	0.12	0.581	0.168	0.070	200.00	0.594	0.204	0.085	1.10
BENNETT 4	0.227	0.150	0.125	28.000	0.641	0.088	0.039	580.00	0.721	0.154	0.041	130.00	0.614	0.175	0.068	620.00	0.625	0.154	0.060	52.00
BENNETT NORTH 1	0.138	0.156	0.139	18.000	0.692	0.082	0.025	<0.01	0.803	0.139	0.025	<0.01	0.708	0.132	0.040	120.00	-	-	-	-
BENTLEY 1	0.159	0.149	0.138	14.000	0.682	0.076	0.028	<0.01	0.764	0.105	0.047	3.00	0.510	0.092	0.054	0.08	0.591	0.102	0.058	160.00
BILBY 1	-	-	-	-	-	-	-	-	0.264	-	-	-	0.295	-	-	-	0.267	-	-	-
BOOBERANNA 1	-	-	-	-	0.610	0.126	0.061	-	0.714	0.099	0.045	-	0.730	0.110	0.044	-	0.674	0.112	0.055	-
BOOKOOI 1	-	-	-	-	0.496	0.141	0.097	-	0.596	0.190	0.103	-	0.526	0.141	0.104	-	0.493	0.072	0.026	-
BOOROONDOO 1	0.525	0.090	0.047	-	0.705	0.092	0.028	-	0.768	0.144	0.036	-	0.537	0.137	0.062	-	0.380	0.156	0.098	-
BRAEMAR 1	0.144	0.214	0.185	-	0.614	0.122	0.049	-	0.689	0.198	0.062	-	0.591	0.190	0.076	-	0.411	0.169	0.099	-
BRIGALOW CREEK 1	-	-	-	-	-	-	-	-	-	-	-	-	0.639	0.142	0.044	-	0.428	0.148	0.078	-
BULWER 1	0.187	0.171	0.152	720.000	0.650	0.044	0.017	0.01	0.795	0.140	0.025	0.09	0.683	0.125	0.037	18.00	0.589	0.180	0.077	260.00
BUNGUNYA 1	-	-	-	-	-	-	-	-	-	-	-	-	0.844	0.082	0.016	-	0.596	0.120	0.051	-
BURGOYNE 1	-	-	-	-	0.394	0.141	0.100	8.60	0.425	0.141	0.102	3.30	0.441	0.126	0.086	0.35	0.444	0.104	0.068	38.00
CABAWIN 1	0.142	-	-	-	0.509	-	-	-	0.426	-	-	-	0.377	-	-	-	0.443	-	-	-
CABAWIN 3	0.155	0.188	0.176	-	0.617	0.083	0.038	-	0.334	0.128	0.104	-	0.505	0.120	0.083	-	0.425	0.188	0.112	-
CABAWIN 4	0.080	0.132	0.122	-	0.537	0.079	0.039	-	0.362	0.109	0.071	-	0.449	0.147	0.080	-	0.411	0.165	0.098	-

Well	Blocky Sandstone Reservoir				J10/TS1 to MFS1				MFS1 to SB2				SB2 to TS3				Ultimate Seal			
	Ave. V_{shale} (v/v)	Ave. PHIT (v/v)	Ave. PHIE (v/v)	Ave. PERM (mD)	Ave. V_{shale} (v/v)	Ave. PHIT (v/v)	Ave. PHIE (v/v)	Ave. PERM (mD)	Ave. V_{shale} (v/v)	Ave. PHIT (v/v)	Ave. PHIE (v/v)	Ave. PERM (mD)	Ave. V_{shale} (v/v)	Ave. PHIT (v/v)	Ave. PHIE (v/v)	Ave. PERM (mD)	Ave. V_{shale} (v/v)	Ave. PHIT (v/v)	Ave. PHIE (v/v)	Ave. PERM (mD)
CANEON 1	-	-	-	-	0.275	0.135	0.110	0.99	0.446	0.139	0.090	0.78	0.476	0.109	0.074	0.07	0.415	0.155	0.108	300.00
CARDIGAN 1	-	-	-	-	-	-	-	-	0.472	-	-	-	0.714	-	-	-	0.765	-	-	-
CERULEAN 2	0.047	-	-	-	0.371	-	-	-	0.604	-	-	-	0.238	-	-	-	0.246	-	-	-
CHANTARA 1	-	-	-	-	-	-	-	-	0.470	-	-	-	0.477	-	-	-	0.532	-	-	-
CHARLIE GW2	-	-	-	-	-	-	-	-	-	-	-	-	0.357	0.137	0.105	0.31	0.618	0.100	0.049	0.06
CHARLOTTE GW2	0.046	0.523	0.222	3000.000	0.509	0.107	0.061	5.70	0.663	0.069	0.010	0.02	-	-	-	-	0.347	0.106	0.078	220.00
CHESTER 1	-	-	-	-	-	-	-	-	-	-	-	-	0.464	0.098	0.067	-	0.673	0.080	0.044	-
CHINCHILLA 4	0.031	-	-	-	0.301	-	-	-	0.391	-	-	-	0.284	-	-	-	0.293	-	-	-
CHURCHIE 1	-	-	-	-	0.271	0.150	0.111	-	0.685	0.194	0.060	-	0.598	0.179	0.069	-	0.603	0.198	0.081	-
CHURCHIE 11	-	-	-	-	0.558	0.147	0.108	-	0.592	0.116	0.075	-	0.540	0.125	0.087	-	0.454	0.112	0.081	-
CHURCHIE 1A	-	-	-	-	0.264	0.144	0.125	0.03	0.669	0.138	0.091	0.03	0.511	0.127	0.091	0.03	0.518	0.102	0.067	0.02
CHURCHIE 2	-	-	-	-	0.406	0.141	0.087	-	0.729	0.183	0.050	-	0.596	0.182	0.072	-	0.601	0.203	0.082	-
CHURCHIE 3	-	-	-	-	0.400	0.126	0.112	0.03	0.612	0.113	0.092	0.03	0.533	0.107	0.089	0.03	0.557	0.096	0.077	0.02
CHURCHIE 4	-	-	-	-	0.292	0.183	0.131	-	0.694	0.217	0.062	-	0.574	0.191	0.078	-	0.596	0.208	0.088	-
CHURCHIE 5	-	-	-	-	0.219	0.136	0.120	0.03	0.652	0.113	0.072	0.03	0.597	0.113	0.071	0.03	0.667	0.090	0.043	0.02
CHURCHIE 6	-	-	-	-	0.236	0.163	0.147	-	0.673	0.106	0.061	-	0.558	0.127	0.088	-	0.536	0.105	0.069	-
CHURCHIE 7	-	-	-	-	0.472	0.151	0.118	-	0.621	0.159	0.117	-	0.514	0.139	0.103	-	0.589	0.102	0.062	-
CHURCHIE WEST 1	-	-	-	-	-	-	-	-	0.560	0.104	0.065	-	0.552	0.111	0.073	-	0.622	0.105	0.063	-
COALBAH 1	-	-	-	-	0.435	0.128	0.077	-	0.634	0.165	0.059	-	0.576	0.165	0.070	-	0.540	0.200	0.094	-
COBALT 1	0.041	-	-	-	0.353	-	-	-	0.670	-	-	-	0.547	-	-	-	0.574	-	-	-
COMBABULA 352 MON-P	0.074	0.198	0.192	920.000	0.514	0.085	0.040	0.22	0.419	0.086	0.049	0.10	0.598	-	-	-	0.532	-	-	-
CONDABRI 13	0.060	0.213	0.207	2100.000	0.577	0.096	0.045	0.47	0.590	0.076	0.024	0.02	0.637	0.105	0.047	0.18	0.527	0.114	0.069	36.00
CONDABRI INJ2-P	0.118	0.168	0.159	870.000	0.667	0.093	0.027	7.40	0.673	-	-	-	0.629	-	-	-	0.516	-	-	-
CONDABRI MB9-H	0.130	0.180	0.169	-	0.674	0.071	0.011	-	0.686	0.072	0.012	-	0.645	0.091	0.034	-	0.553	0.111	0.064	-
CONLOI 1	0.124	0.203	0.181	-	0.717	0.146	0.038	-	0.689	0.209	0.062	-	0.662	0.223	0.074	-	0.790	0.181	0.038	-
CONN CREEK 1	0.103	-	-	-	0.644	-	-	-	0.862	-	-	-	0.810	-	-	-	0.830	-	-	-
COOCHIEMUDLO GW2	0.074	0.222	0.215	2300.000	0.434	0.168	0.129	120.00	0.631	0.148	0.092	0.02	-	-	-	-	-	-	-	-
CROSSMAGLEN 1	-	-	-	-	0.210	-	-	-	0.649	-	-	-	0.602	-	-	-	0.700	-	-	-
CROWDER NORTH 1	-	-	-	-	0.577	0.125	0.056	-	0.626	0.167	0.057	-	0.583	0.151	0.062	-	0.454	0.170	0.094	-
DAVIDSON 1	0.092	0.157	0.144	16.000	0.741	0.093	0.027	<0.01	0.816	0.145	0.024	<0.01	0.758	0.144	0.035	470.00	0.715	0.173	0.053	370.00
DAYDREAM 1	-	-	-	-	0.283	0.135	0.115	0.03	0.636	0.086	0.041	0.02	0.552	0.089	0.051	0.02	0.517	0.082	0.047	0.02
DEVONDALE 1	0.385	0.141	0.110	25.000	0.704	0.093	0.038	0.03	0.823	0.090	0.026	0.04	0.626	0.110	0.060	0.02	0.607	0.071	0.024	0.45

Well	Blocky Sandstone Reservoir				J10/TS1 to MFS1				MFS1 to SB2				SB2 to TS3				Ultimate Seal			
	Ave. V_{shale} (v/v)	Ave. PHIT (v/v)	Ave. PHIE (v/v)	Ave. PERM (mD)	Ave. V_{shale} (v/v)	Ave. PHIT (v/v)	Ave. PHIE (v/v)	Ave. PERM (mD)	Ave. V_{shale} (v/v)	Ave. PHIT (v/v)	Ave. PHIE (v/v)	Ave. PERM (mD)	Ave. V_{shale} (v/v)	Ave. PHIT (v/v)	Ave. PHIE (v/v)	Ave. PERM (mD)	Ave. V_{shale} (v/v)	Ave. PHIT (v/v)	Ave. PHIE (v/v)	Ave. PERM (mD)
DIAMOND 1	-	-	-	-	-	-	-	-	-	-	-	-	0.481	-	-	-	0.437	-	-	-
DILBONG 1	0.141	0.346	0.116	-	0.754	0.070	0.016	-	0.613	0.110	0.044	-	0.711	0.147	0.040	-	0.532	0.157	0.073	-
DORCA 1	-	-	-	-	-	-	-	-	0.482	-	-	-	0.641	-	-	-	0.624	-	-	-
DULACCA 1	0.014	0.174	0.172	310.000	0.531	0.062	0.028	7.60	0.564	0.156	0.068	17.00	0.430	0.151	0.085	110.00	0.597	0.103	0.044	0.14
DURHAM DEEP 1	0.085	0.205	0.198	1200.000	0.464	0.094	0.052	4.40	0.581	0.078	0.028	0.02	0.592	0.108	0.050	6.70	0.461	0.122	0.074	0.91
DURHAM RANCH 1	0.211	0.175	0.140	-	0.773	0.113	0.027	-	0.905	0.134	0.010	-	0.697	0.156	0.055	-	0.493	0.150	0.058	-
DURHAM RANCH 10	0.180	-	-	-	0.828	-	-	-	0.903	-	-	-	0.868	-	-	-	0.790	-	-	-
DURHAM RANCH 11	0.225	0.142	0.115	-	0.739	0.077	0.022	-	0.810	0.158	0.027	-	0.793	0.115	0.022	-	0.830	0.157	0.026	-
DURHAM RANCH 12	0.245	0.137	0.118	75.000	0.818	0.033	0.003	0.01	0.846	0.047	0.002	0.02	0.811	0.039	0.002	0.02	0.785	0.047	0.013	0.15
DURHAM RANCH 13	0.220	0.158	0.139	-	0.774	0.069	0.021	-	0.821	0.045	-	-	0.804	0.020	0.002	-	0.708	0.060	0.016	-
DURHAM RANCH 15	0.197	0.162	0.132	-	0.627	0.119	0.053	-	0.820	0.118	0.017	-	0.853	0.179	0.025	-	0.832	0.154	0.025	-
DURHAM RANCH 18	0.170	0.228	0.190	-	0.777	0.140	0.038	-	0.876	0.140	0.018	-	0.799	0.166	0.034	-	0.757	0.138	0.040	-
DURHAM RANCH 20	0.185	0.143	0.127	-	0.710	0.054	0.022	-	0.861	0.038	0.002	-	0.843	0.029	0.001	-	0.739	0.073	0.036	-
DURHAM RANCH 21	0.208	0.208	0.171	-	0.636	0.102	0.042	-	0.836	0.134	0.016	-	0.758	0.137	0.024	-	0.660	0.131	0.032	-
DURHAM RANCH 23	0.234	0.150	0.131	92.000	0.698	0.046	0.015	0.03	0.826	0.045	0.001	0.02	0.833	0.033	-	0.02	0.711	0.066	0.028	0.29
DURHAM RANCH 27	0.203	-	-	-	0.704	-	-	-	0.795	-	-	-	0.719	-	-	-	0.712	-	-	-
DURHAM RANCH 29	0.189	0.192	0.173	950.000	0.537	0.125	0.081	420.00	0.847	0.084	0.016	130.00	0.824	0.119	0.038	0.03	0.736	0.118	0.058	190.00
DURHAM RANCH 37	0.189	0.152	0.136	-	0.688	0.070	0.028	-	0.815	0.055	0.005	-	0.829	0.059	0.001	-	0.500	0.057	0.007	-
DURHAM RANCH 42	0.202	0.200	0.183	-	0.730	0.082	0.028	-	0.815	0.110	0.038	-	0.817	0.089	0.019	-	0.789	0.091	0.029	-
DURHAM RANCH 57	0.207	-	-	-	0.678	-	-	-	0.808	-	-	-	0.849	-	-	-	0.793	-	-	-
DURHAM RANCH 59	0.196	-	-	-	0.637	-	-	-	0.847	-	-	-	0.837	-	-	-	0.789	-	-	-
DURHAM RANCH 61	0.239	0.212	0.187	2900.000	0.742	0.109	0.043	4.30	0.878	0.086	0.008	0.02	0.731	0.107	0.042	64.00	0.719	0.115	0.056	17.00
DURHAM RANCH 62	0.195	0.149	0.132	-	0.591	0.131	0.084	-	0.807	0.091	0.023	-	0.756	0.087	0.029	-	0.669	0.230	0.176	-
DURHAM RANCH 91	0.023	0.202	0.200	-	0.442	0.100	0.061	-	0.451	0.111	0.071	-	0.482	0.109	0.067	-	0.487	0.087	0.047	-
DURHAM RANCH 92	0.197	0.164	0.147	-	0.635	0.090	0.047	-	0.897	0.062	0.001	-	0.847	0.055	0.001	-	0.451	0.113	0.057	-
DURHAM RANCH 97	0.182	0.159	0.143	-	0.742	0.086	0.046	-	0.865	0.079	0.023	-	0.839	0.058	0.003	-	0.601	0.039	0.001	-
EDENDALE 1	0.057	0.177	0.167	27.000	0.633	0.151	0.057	<0.01	0.635	0.148	0.062	0.02	0.352	0.168	0.116	2.40	0.579	0.159	0.072	1.20
EMU APPLE 4	-	-	-	-	-	-	-	-	0.472	-	-	-	0.473	-	-	-	0.613	-	-	-
FAIRVIEW 128	0.182	-	-	-	0.583	-	-	-	0.707	-	-	-	0.761	-	-	-	0.827	-	-	-
FAIRVIEW 131	0.187	-	-	-	0.594	-	-	-	0.860	-	-	-	0.759	-	-	-	0.886	-	-	-
FAIRVIEW 32	0.213	-	-	-	0.522	-	-	-	0.874	-	-	-	0.838	-	-	-	0.723	-	-	-
FAIRYMOUNT 1	-	-	-	-	-	-	-	-	-	-	-	-	0.553	0.100	0.042	-	0.426	0.127	0.078	-

Well	Blocky Sandstone Reservoir				J10/TS1 to MFS1				MFS1 to SB2				SB2 to TS3				Ultimate Seal			
	Ave. V_{shale} (v/v)	Ave. PHIT (v/v)	Ave. PHIE (v/v)	Ave. PERM (mD)	Ave. V_{shale} (v/v)	Ave. PHIT (v/v)	Ave. PHIE (v/v)	Ave. PERM (mD)	Ave. V_{shale} (v/v)	Ave. PHIT (v/v)	Ave. PHIE (v/v)	Ave. PERM (mD)	Ave. V_{shale} (v/v)	Ave. PHIT (v/v)	Ave. PHIE (v/v)	Ave. PERM (mD)	Ave. V_{shale} (v/v)	Ave. PHIT (v/v)	Ave. PHIE (v/v)	Ave. PERM (mD)
FANTOME 1	0.103	0.144	0.137	-	0.644	0.081	0.031	-	0.646	0.103	0.039	-	0.576	0.100	0.045	-	0.550	0.085	0.028	-
FERRETT 1	0.074	0.216	0.202	2400.000	0.619	0.044	0.019	2.80	0.680	0.204	0.061	0.02	0.639	0.170	0.061	0.14	0.637	0.133	0.051	0.30
FORKES CREEK 1	0.116	0.126	0.124	-	0.539	0.057	0.048	-	0.726	0.036	0.023	-	0.612	0.070	0.059	-	0.561	0.096	0.086	-
FORMOSA DOWNS 1	-	-	-	-	-	-	-	-	0.415	0.106	0.098	-	0.548	0.096	0.083	-	0.464	0.105	0.091	-
FRENEAU 1	-	-	-	-	-	-	-	-	0.575	0.080	0.058	-	0.421	0.115	0.100	-	0.416	0.124	0.109	-
GAMBIER PARK 1	-	-	-	-	0.308	0.160	0.139	-	0.537	0.150	0.113	-	0.508	0.132	0.095	-	0.559	0.141	0.094	-
GARAH 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.369	0.173	0.120	-
GIDDI GIDDI 1	0.115	0.154	0.138	-	0.727	0.109	0.032	-	0.737	0.123	0.034	-	0.685	0.153	0.051	-	0.565	0.157	0.069	-
GILGAI 1	0.160	0.152	0.132	-	0.694	0.095	0.034	-	0.608	0.133	0.047	-	0.720	0.136	0.036	-	0.589	0.134	0.055	-
GILIGULGUL 1	0.576	0.082	0.040	62.000	-	-	-	-	-	-	-	-	0.950	0.097	0.003	0.02	0.881	0.122	0.014	0.05
GLEN 1	0.138	0.161	0.152	-	0.675	0.062	0.022	<0.01	0.578	0.086	0.047	<0.01	0.538	0.102	0.067	21.00	0.443	0.071	0.043	49.00
GLENMORGAN 1	-	-	-	-	0.195	-	-	-	0.505	-	-	-	0.462	-	-	-	0.455	-	-	-
GRAIL NORTH 1	-	-	-	-	-	-	-	-	0.783	0.071	0.038	-	0.547	0.106	0.083	-	0.455	0.122	0.099	-
GUMS 1	0.091	0.159	0.153	14.000	0.643	0.068	0.023	<0.01	0.775	0.065	0.008	<0.01	0.696	0.086	0.035	0.02	0.462	0.080	0.049	1.90
GURULMUNDI 1	0.044	0.219	0.211	-	0.560	0.093	0.041	-	0.538	0.133	0.061	-	0.533	0.192	0.088	-	0.528	0.128	0.061	-
HALFMOON 1	0.320	0.159	0.137	82.000	0.745	0.082	0.024	0.06	0.733	0.130	0.072	1.60	0.616	0.111	0.064	<0.01	0.523	0.135	0.095	44.00
HARICOT 1	-	-	-	-	0.299	-	-	-	0.660	-	-	-	0.625	-	-	-	0.517	-	-	-
HAYES CREEK 1	0.169	0.114	0.096	-	0.592	0.072	0.034	-	0.843	0.096	0.018	-	0.764	0.128	0.028	-	0.638	0.126	0.047	-
HEIDI 1	-	-	-	-	-	-	-	-	-	-	-	-	0.330	0.156	0.112	-	0.325	0.153	0.122	-
HERMITAGE 1	-	-	-	-	0.375	0.153	0.119	59.00	0.388	-	-	-	0.401	-	-	-	0.419	-	-	-
HOADLEYS 1	0.162	0.194	0.150	-	0.527	0.084	0.078	-	0.612	0.093	0.085	-	0.459	0.121	0.115	-	0.445	0.100	0.094	-
HOLLYROOD 3	-	-	-	-	-	-	-	-	0.404	-	-	-	0.589	-	-	-	0.668	-	-	-
HORSESHOE 1	-	-	-	-	0.577	0.126	0.079	-	0.580	0.154	0.112	-	0.542	0.145	0.107	-	0.546	0.147	0.095	-
HORSESHOE 2	-	-	-	-	0.303	0.140	0.118	-	0.438	0.105	0.074	-	0.568	0.129	0.068	-	0.528	0.218	0.102	-
HUMBUG CREEK 1	0.137	0.165	0.143	26.000	0.725	0.094	0.028	<0.01	0.787	0.161	0.034	0.03	0.646	0.148	0.051	0.14	-	-	-	-
HUMBUG CREEK 2	0.132	0.156	0.141	-	0.637	0.062	0.030	-	0.820	0.117	0.020	-	0.726	0.146	0.039	-	0.545	0.146	0.068	-
IMINBAH 1	-	-	-	-	0.585	0.121	0.057	-	0.559	0.158	0.067	-	0.612	0.126	0.051	-	0.365	0.167	0.107	-
KEGGABILLA 1	0.707	0.080	0.042	-	0.489	0.122	0.088	-	0.579	0.126	0.090	-	0.446	0.135	0.100	-	0.436	0.112	0.082	-
KENYA EAST GW7	0.058	0.223	0.202	1600.000	0.519	0.095	0.049	3.30	0.699	0.063	0.001	0.01	0.535	0.120	0.073	0.17	0.505	0.128	0.086	28.00
KILLALOE 1	0.621	-	-	-	0.701	-	-	-	0.690	-	-	-	0.677	-	-	-	0.416	-	-	-
KILMICHAEL 1	-	-	-	-	-	-	-	-	0.438	-	-	-	0.553	-	-	-	0.565	-	-	-
KINKABILLA CREEK 1	-	-	-	-	0.452	0.101	0.058	-	0.714	0.069	0.021	-	0.612	0.149	0.049	-	0.580	0.148	0.059	-

Well	Blocky Sandstone Reservoir				J10/TS1 to MFS1				MFS1 to SB2				SB2 to TS3				Ultimate Seal			
	Ave. V_{shale} (v/v)	Ave. PHIT (v/v)	Ave. PHIE (v/v)	Ave. PERM (mD)	Ave. V_{shale} (v/v)	Ave. PHIT (v/v)	Ave. PHIE (v/v)	Ave. PERM (mD)	Ave. V_{shale} (v/v)	Ave. PHIT (v/v)	Ave. PHIE (v/v)	Ave. PERM (mD)	Ave. V_{shale} (v/v)	Ave. PHIT (v/v)	Ave. PHIE (v/v)	Ave. PERM (mD)	Ave. V_{shale} (v/v)	Ave. PHIT (v/v)	Ave. PHIE (v/v)	Ave. PERM (mD)
KOGAN 1	0.234	-	-	-	0.766	-	-	-	0.814	-	-	-	0.641	-	-	-	0.556	-	-	-
KOGAN SOUTH 1	0.398	0.150	0.112	140.000	0.786	0.099	0.021	<0.01	0.763	0.128	0.031	250.00	0.688	0.141	0.044	1.20	0.488	0.143	0.075	1400.00
KOORINGA 1	-	-	-	-	0.544	-	-	-	0.817	-	-	-	0.816	-	-	-	0.835	-	-	-
LANCEWOOD 1	-	-	-	-	0.510	-	-	-	0.623	-	-	-	0.535	-	-	-	0.531	-	-	-
LAWSON 1	0.160	0.160	0.137	-	0.763	0.079	0.026	-	0.935	0.150	0.009	-	0.727	0.135	0.034	-	0.698	0.140	0.046	-
LEICHHARDT 1	0.190	0.151	0.130	11.000	0.574	0.108	0.060	300.00	0.734	0.141	0.034	<0.01	0.553	0.140	0.064	20.00	0.666	0.140	0.043	1000.00
MAXIMA 1	0.053	0.163	0.155	-	0.698	0.120	0.040	-	0.794	0.113	0.024	-	0.535	0.153	0.072	-	0.522	0.172	0.081	-
MAXIMA MAX 1	0.090	0.154	0.141	-	0.724	0.107	0.032	-	0.715	0.148	0.041	-	0.531	0.162	0.077	-	0.440	0.164	0.094	-
MAYFIELD 1	-	-	-	-	0.588	-	-	-	0.716	-	-	-	0.723	-	-	-	0.711	-	-	-
MEANDARRA 1	0.227	0.126	0.106	-	0.757	0.095	0.025	-	0.916	0.160	0.014	-	0.691	0.143	0.041	-	0.715	0.147	0.044	-
MENTOR 1	-	-	-	-	0.358	0.144	0.092	-	0.607	0.205	0.079	-	0.506	0.160	0.076	-	0.447	0.188	0.101	-
MERIVALE 1	0.054	-	-	-	0.401	-	-	-	0.534	-	-	-	0.437	-	-	-	0.414	-	-	-
MERIVALE 7 ST1	0.089	-	-	-	0.475	-	-	-	0.528	-	-	-	0.487	-	-	-	0.391	-	-	-
MERIVALE 8	0.082	-	-	-	0.469	-	-	-	0.658	-	-	-	0.570	-	-	-	0.454	-	-	-
MERRIT 1	-	-	-	-	-	-	-	-	0.435	0.133	-	-	0.523	0.133	-	-	0.605	0.147	-	-
MILES 1	0.052	0.209	0.205	1700.000	0.639	0.096	0.039	11.00	0.554	0.102	0.053	0.02	0.586	0.112	0.061	0.39	0.603	0.119	0.067	15.00
MILGARRA 1	0.124	0.139	0.130	4.700	0.656	0.067	0.032	15.00	0.772	0.082	0.032	<0.01	0.634	0.089	0.048	37.00	0.397	0.105	0.085	150.00
MINDAGABIE 1	-	-	-	-	0.630	0.099	0.050	-	0.652	0.093	0.060	-	0.530	0.125	0.083	-	0.356	0.160	0.132	-
MIREEKA 1	-	-	-	-	-	-	-	-	-	-	-	-	0.392	-	-	-	0.534	-	-	-
MOA 1	0.092	-	-	-	0.569	-	-	-	0.567	-	-	-	0.624	-	-	-	0.533	-	-	-
MOONIE 16	0.191	0.143	0.118	-	0.561	0.142	0.062	-	0.598	0.227	0.089	-	0.472	0.167	0.088	-	0.474	0.204	0.106	-
MOONIE 21	0.055	0.438	0.168	-	0.546	0.097	0.053	-	0.596	0.167	0.063	-	0.524	0.171	0.083	-	0.449	0.177	0.099	-
MOONIE 23	0.151	0.169	0.144	-	0.578	0.145	0.064	-	0.678	0.244	0.076	-	0.568	0.200	0.084	-	0.441	0.199	0.111	-
MOONIE 24	0.264	0.136	0.102	-	0.607	0.129	0.049	-	0.661	0.245	0.084	-	0.603	0.200	0.077	-	0.487	0.203	0.103	-
MOONIE 25	0.192	0.148	0.121	-	0.548	0.153	0.068	-	0.635	0.224	0.078	-	0.562	0.215	0.093	-	0.419	0.184	0.105	-
MOONIE 27	0.128	0.161	0.142	-	0.579	0.101	0.050	-	0.597	0.178	0.069	-	0.577	0.173	0.076	-	0.356	0.181	0.121	-
MOONIE 28	0.151	0.260	0.136	-	0.553	0.098	0.050	-	0.657	0.189	0.065	-	0.595	0.174	0.074	-	0.450	0.170	0.097	-
MOONIE 31	0.115	0.161	0.135	75.000	0.665	0.102	0.035	0.87	0.745	0.177	0.055	0.57	0.610	0.150	0.063	40.00	0.408	0.144	0.084	11.00
MOONIE 33	0.252	0.141	0.108	36.000	0.688	0.102	0.008	0.41	0.621	0.138	0.051	0.55	0.588	0.135	0.057	8.40	0.465	0.149	0.086	3.50
MOONIE 34	0.183	0.141	0.116	35.000	0.608	0.102	0.038	2.00	0.653	0.134	0.042	0.45	0.549	0.135	0.059	6.40	0.441	0.128	0.067	4.70
MOONIE 36	0.198	0.135	0.109	47.000	0.535	0.111	0.050	5.80	0.673	0.209	0.081	0.50	0.574	0.158	0.067	3.50	0.380	0.153	0.096	20.00
MOONIE 37	0.202	0.137	0.114	-	0.473	0.109	0.063	-	0.583	0.197	0.083	-	0.491	0.159	0.081	-	0.337	0.174	0.117	-

Well	Blocky Sandstone Reservoir Ave. V_{shale} (v/v)	Blocky Sandstone Reservoir Ave. PHIT (v/v)	Blocky Sandstone Reservoir Ave. PHIE (v/v)	Blocky Sandstone Reservoir Ave. PERM (mD)	J10/TS1 to MFS1 Ave. V_{shale} (v/v)	J10/TS1 to MFS1 Ave. PHIT (v/v)	J10/TS1 to MFS1 Ave. PHIE (v/v)	J10/TS1 to MFS1 Ave. PERM (mD)	MFS1 to SB2 Ave. V_{shale} (v/v)	MFS1 to SB2 Ave. PHIT (v/v)	MFS1 to SB2 Ave. PHIE (v/v)	MFS1 to SB2 Ave. PERM (mD)	SB2 to TS3 Ave. V_{shale} (v/v)	SB2 to TS3 Ave. PHIT (v/v)	SB2 to TS3 Ave. PHIE (v/v)	SB2 to TS3 Ave. PERM (mD)	Ultimate Seal Ave. V_{shale} (v/v)	Ultimate Seal Ave. PHIT (v/v)	Ultimate Seal Ave. PHIE (v/v)	Ultimate Seal Ave. PERM (mD)
MOONIE 38	0.176	0.130	0.112	-	0.609	0.109	0.046	-	0.660	0.174	0.060	-	0.588	0.179	0.077	-	0.475	0.161	0.088	-
MOONIE 39	0.098	0.141	0.129	68.000	0.555	0.103	0.048	14.00	0.630	0.142	0.060	1.30	0.559	0.149	0.071	3.00	0.457	0.130	0.068	7.70
MOONIE 40	0.222	0.178	0.148	110.000	0.589	0.131	0.052	5.90	0.629	0.093	0.015	0.57	0.523	0.117	0.047	20.00	0.443	0.077	0.022	5.60
MOONIE 41	0.143	0.185	0.161	200.000	0.578	0.145	0.048	11.00	0.681	0.151	0.037	0.64	0.533	0.158	0.069	30.00	0.466	0.147	0.069	5.00
MOONIE 42	0.237	0.177	0.151	220.000	0.576	0.124	0.058	4.50	0.655	0.165	0.095	0.59	0.560	0.169	0.105	11.00	0.359	0.163	0.124	32.00
MOONIE 43	0.331	0.144	0.112	79.000	0.607	0.136	0.052	3.50	0.616	0.160	0.073	81.00	0.623	0.154	0.067	0.81	0.420	0.128	0.069	74.00
MOONIE 44	0.165	0.131	0.110	30.000	0.673	0.107	0.025	0.39	0.576	0.134	0.050	0.52	0.576	0.134	0.052	0.80	0.440	0.135	0.073	8.90
MUGGLETON 1	-	-	-	-	0.334	-	-	-	0.479	-	-	-	0.410	-	-	-	0.433	-	-	-
MURILLA 1	0.175	0.134	0.116	23.000	0.744	0.067	0.021	<0.01	0.616	0.116	0.041	<0.01	0.688	0.139	0.040	<0.01	0.436	0.131	0.074	73.00
MUYA CREEK 1	0.026	-	-	-	0.566	-	-	-	0.568	-	-	-	0.483	-	-	-	0.395	-	-	-
MYALL CREEK 3	-	-	-	-	0.232	0.161	0.126	-	0.605	0.141	0.059	-	0.600	0.159	0.061	-	0.580	0.192	0.083	-
MYALL CREEK 4	-	-	-	-	0.238	0.135	0.107	-	0.754	0.153	0.042	-	0.582	0.173	0.069	-	0.606	0.212	0.086	-
MYALL CREEK 6	-	-	-	-	0.379	0.171	0.104	-	0.503	0.172	0.081	-	0.507	0.154	0.072	-	0.569	0.184	0.081	-
MYALL CREEK 7	-	-	-	-	0.370	0.160	0.134	-	0.525	0.148	0.112	-	0.539	0.128	0.090	-	0.541	0.108	0.073	-
MYALL CREEK 8	-	-	-	-	0.176	0.155	0.129	-	0.493	0.141	0.071	-	0.508	0.178	0.087	-	0.580	0.209	0.089	-
MYALL CREEK 9	-	-	-	-	0.291	0.146	0.126	0.03	0.655	0.111	0.065	0.02	0.577	0.124	0.083	0.03	0.575	0.118	0.079	0.02
MYALL CREEK EAST 1	-	-	-	-	0.479	0.101	0.067	-	0.518	0.125	0.091	-	0.570	0.129	0.089	-	0.532	0.108	0.072	-
NAMARAH 4	-	-	-	-	-	-	-	-	0.454	-	-	-	0.368	-	-	-	0.506	-	-	-
NAMARAH 6	-	-	-	-	-	-	-	-	0.602	0.059	0.028	-	0.354	0.125	0.100	-	0.555	0.074	0.039	-
NIBBLEFOOT 1	-	-	-	-	-	-	-	-	-	-	-	-	0.573	-	-	-	0.559	-	-	-
NOMBY 1	0.086	0.201	0.184	-	0.530	0.140	0.068	-	-	-	-	-	0.634	0.156	0.060	-	0.571	0.201	0.088	-
NOORINDOO 2	-	-	-	-	0.528	0.158	0.076	-	0.780	0.157	0.035	-	0.625	0.172	0.063	-	0.643	0.198	0.072	-
NORKAM 1	-	-	-	-	0.310	0.143	0.123	0.03	0.536	0.083	0.049	0.02	0.580	0.114	0.077	0.03	0.484	0.109	0.078	0.02
NORTH ANNABELLE 1	-	-	-	-	-	-	-	-	0.915	-	-	-	0.466	-	-	-	0.659	-	-	-
NORTH CHERWONDAH 1	0.010	0.213	0.211	-	0.407	0.158	0.095	-	0.461	0.190	0.101	-	0.307	0.178	0.123	-	0.432	0.130	0.071	-
OGILVIE CREEK 1	-	-	-	-	0.421	0.121	0.091	0.03	0.543	0.135	0.097	0.03	0.612	0.122	0.080	0.03	0.588	0.097	0.057	0.02
OGILVIE CREEK 2	-	-	-	-	0.240	0.153	0.136	0.03	0.635	0.106	0.061	0.03	0.528	0.118	0.081	0.03	0.570	0.101	0.063	0.02
OVERSTON 1	-	-	-	-	0.257	0.168	0.154	-	0.565	0.051	0.026	-	0.583	0.113	0.082	-	0.628	0.097	0.064	-
PALOMA 1	-	-	-	-	0.514	0.116	0.066	-	0.717	0.094	0.040	-	0.594	0.157	0.076	-	0.536	0.158	0.088	-
PARKNOOK 3	-	-	-	-	-	-	-	-	0.319	-	-	-	0.596	0.062	0.051	-	0.536	0.107	0.097	-
PARKNOOK 7	-	-	-	-	-	-	-	-	-	-	-	-	0.560	-	-	-	0.635	-	-	-
PEAT 12	0.102	0.208	0.199	2000.000	0.482	0.154	0.100	620.00	0.591	0.188	0.074	0.03	0.680	0.204	0.062	0.03	0.633	0.298	0.108	0.03

Well	Blocky Sandstone Reservoir				J10/TS1 to MFS1				MFS1 to SB2				SB2 to TS3				Ultimate Seal			
	Ave. V_{shale} (v/v)	Ave. PHIT (v/v)	Ave. PHIE (v/v)	Ave. PERM (mD)	Ave. V_{shale} (v/v)	Ave. PHIT (v/v)	Ave. PHIE (v/v)	Ave. PERM (mD)	Ave. V_{shale} (v/v)	Ave. PHIT (v/v)	Ave. PHIE (v/v)	Ave. PERM (mD)	Ave. V_{shale} (v/v)	Ave. PHIT (v/v)	Ave. PHIE (v/v)	Ave. PERM (mD)	Ave. V_{shale} (v/v)	Ave. PHIT (v/v)	Ave. PHIE (v/v)	Ave. PERM (mD)
PEAT 15	0.084	0.213	0.208	3700.000	0.646	0.158	0.057	170.00	0.642	0.207	0.075	0.08	0.570	0.195	0.081	1.90	0.598	0.326	0.132	450.00
PEAT 27	0.110	0.179	0.169	-	0.320	0.162	0.133	-	0.613	0.112	0.061	-	0.666	0.106	0.047	-	0.626	0.078	0.029	-
PEAT 32	0.020	0.189	0.187	-	0.292	0.151	0.125	-	0.661	0.129	0.073	-	0.676	0.147	0.087	-	0.620	0.136	0.084	-
PEMBROKE 1	-	-	-	-	-	-	-	-	0.478	-	-	-	0.387	-	-	-	0.732	-	-	-
PINE HILLS 7	0.098	0.217	0.208	1700.000	0.450	0.123	0.083	40.00	0.606	0.094	0.040	0.08	0.564	0.104	0.054	14.00	0.550	0.101	0.055	1.80
PINE RIDGE 15	-	-	-	-	0.535	-	-	-	0.697	-	-	-	0.618	-	-	-	0.688	-	-	-
PINEVIEW 1	0.016	0.214	0.213	1600.000	0.546	0.087	0.038	11.00	0.675	0.126	0.063	0.31	0.611	0.107	0.051	0.73	0.627	0.075	0.023	0.08
PONY HILLS EAST 1	0.205	-	-	-	0.486	-	-	-	0.878	-	-	-	0.840	-	-	-	0.745	-	-	-
RASLIE 6	-	-	-	-	0.474	-	-	-	0.419	-	-	-	0.620	-	-	-	0.571	-	-	-
REBEN DOWNS 1	0.079	-	-	-	0.526	-	-	-	0.642	-	-	-	0.446	-	-	-	0.477	-	-	-
REDBANK 1	-	-	-	-	-	-	-	-	-	-	-	-	0.423	0.135	0.095	-	0.442	0.122	0.090	-
REEDY CREEK INJ2-P	0.104	0.196	0.187	730.000	0.290	0.143	0.119	9.00	-	-	-	-	-	-	-	-	-	-	-	-
REEDY CREEK INJ4-P	0.142	0.190	0.177	650.000	0.770	0.090	0.021	0.69	0.646	0.058	0.013	0.03	0.603	-	-	-	0.567	-	-	-
REEDY CREEK MB3-H	0.122	0.195	0.184	-	0.453	0.101	0.060	-	0.581	0.118	0.065	-	0.597	0.100	0.047	-	0.561	0.086	0.040	-
RIDGEWOOD 6	0.328	0.152	0.110	-	0.908	0.117	0.002	-	0.859	0.113	0.008	-	0.833	0.129	0.027	-	0.646	0.103	0.024	-
RIVERSIDE 1	-	-	-	-	0.359	0.141	0.120	0.03	0.549	0.100	0.068	0.03	0.578	0.103	0.069	0.03	0.592	0.102	0.069	0.02
RIVERSIDE SOUTH 1	-	-	-	-	0.400	0.159	0.095	-	0.603	0.211	0.080	-	0.423	0.151	0.084	-	0.614	0.198	0.079	-
ROCKFERN 1	-	-	-	-	-	-	-	-	-	-	-	-	0.432	0.093	0.065	-	0.360	0.114	0.089	-
ROCKWOOD 1	-	-	-	-	0.760	0.050	0.015	-	0.547	0.081	0.039	-	0.663	0.080	0.029	-	0.596	0.123	0.055	-
ROCKWOOD 2	0.161	0.123	0.110	-	0.697	0.064	0.019	-	0.682	0.102	0.035	-	0.687	0.100	0.031	-	0.579	0.100	0.046	-
ROMA 8	-	-	-	-	0.385	-	-	-	0.763	-	-	-	0.741	-	-	-	0.622	-	-	-
ROMA DOWNS 1	-	-	-	-	-	-	-	-	0.678	-	-	-	0.573	-	-	-	0.572	-	-	-
ROOKWOOD WEST 1	-	-	-	-	-	-	-	-	-	-	-	-	0.535	-	-	-	0.685	-	-	-
ROSWIN 1	-	-	-	-	-	-	-	-	-	-	-	-	0.504	-	-	-	0.475	-	-	-
SAMARI PLAINS 2	-	-	-	-	-	-	-	-	-	-	-	-	0.439	-	-	-	0.578	-	-	-
SANDY CREEK 2	-	-	-	-	-	-	-	-	-	-	-	-	0.558	0.155	-	-	0.530	0.125	-	-
SCOTIA 16	0.060	0.211	0.206	1400.000	0.464	0.164	0.123	630.00	0.672	0.098	0.039	0.37	0.677	0.155	0.095	9.90	0.605	0.123	0.073	0.40
SCOTIA 20	0.045	0.226	0.222	2400.000	0.635	0.142	0.085	12.00	0.606	0.173	0.118	1.60	0.548	0.184	0.135	21.00	0.395	0.143	0.096	0.19
SCOTIA 6	0.029	0.195	0.189	-	0.292	0.158	0.115	-	0.458	0.107	0.055	-	0.404	0.082	0.052	-	0.293	-	-	-
SCOTIA 9	0.015	0.236	0.234	3600.000	0.478	0.137	0.094	460.00	0.656	0.073	0.015	0.01	0.709	0.136	0.074	0.24	0.609	0.138	0.090	0.51
SLATEHILL 1	0.146	0.202	0.190	1900.000	0.558	0.101	0.051	1.40	0.610	0.103	0.049	0.02	0.573	0.113	0.062	0.02	0.553	0.103	0.057	0.54
SOUTH BURUNGA 1	0.006	0.224	0.223	-	0.251	0.181	0.137	-	0.287	0.120	0.091	-	0.302	0.059	0.042	-	0.298	0.054	0.042	-

Well	Blocky Sandstone Reservoir				J10/TS1 to MFS1				MFS1 to SB2				SB2 to TS3				Ultimate Seal			
	Ave. V_{shale} (v/v)	Ave. PHIT (v/v)	Ave. PHIE (v/v)	Ave. PERM (mD)	Ave. V_{shale} (v/v)	Ave. PHIT (v/v)	Ave. PHIE (v/v)	Ave. PERM (mD)	Ave. V_{shale} (v/v)	Ave. PHIT (v/v)	Ave. PHIE (v/v)	Ave. PERM (mD)	Ave. V_{shale} (v/v)	Ave. PHIT (v/v)	Ave. PHIE (v/v)	Ave. PERM (mD)	Ave. V_{shale} (v/v)	Ave. PHIT (v/v)	Ave. PHIE (v/v)	Ave. PERM (mD)
SPRING GULLY 10	0.155	0.162	0.148	-	0.570	0.124	0.077	-	0.798	0.050	0.005	-	0.827	0.062	0.006	-	0.762	0.069	0.011	-
SPRING GULLY 115	0.172	0.207	0.192	-	0.684	0.092	0.042	-	0.825	0.081	0.014	-	0.802	0.114	0.042	-	0.831	0.096	0.028	-
SPRING GULLY 16	0.187	0.193	0.173	1100.000	0.709	0.111	0.049	2.00	0.828	0.091	0.018	0.02	0.854	0.089	0.013	0.06	0.826	0.084	0.017	0.04
SPRING GULLY 19	0.193	0.160	0.142	-	0.729	0.078	0.038	-	0.852	0.059	0.003	-	0.853	0.072	0.009	-	0.793	0.064	0.007	-
SPRING GULLY 22	0.182	0.208	0.192	1300.000	0.625	0.137	0.081	94.00	0.780	0.088	0.018	0.02	0.811	0.092	0.020	1.00	0.818	0.078	0.016	0.06
SPRING GULLY 24	0.192	-	-	-	0.757	-	-	-	0.848	-	-	-	0.804	-	-	-	0.739	-	-	-
SPRING GULLY 27	0.188	0.204	0.188	1300.000	0.711	0.102	0.039	21.00	0.805	0.072	0.010	0.01	0.855	0.100	0.025	0.02	0.846	0.085	0.021	0.06
SPRING GULLY 30	0.205	0.201	0.183	-	0.761	0.075	0.018	-	0.852	0.112	0.037	-	0.763	0.102	0.034	-	0.721	0.108	0.049	-
SPRING GULLY 33	0.201	0.200	0.182	-	0.795	0.087	0.023	-	0.855	0.106	0.031	-	0.819	0.100	0.027	-	0.806	0.083	0.019	-
SPRING GULLY 36	0.248	0.191	0.167	940.000	0.753	0.072	0.015	3.50	0.853	0.102	0.028	0.02	0.797	0.096	0.026	0.02	0.821	0.081	0.018	0.02
SPRING GULLY 38	0.221	0.190	0.171	-	0.489	0.159	0.114	-	0.794	0.081	0.023	-	0.833	0.107	0.034	-	0.773	0.092	0.025	-
SPRING GULLY 40	0.197	0.198	0.181	-	0.699	0.115	0.059	-	0.791	0.085	0.020	-	0.850	0.104	0.030	-	0.798	0.093	0.024	-
SPRING GULLY 41	0.187	-	-	-	0.616	-	-	-	0.820	-	-	-	0.806	-	-	-	0.745	-	-	-
SPRING GULLY 45	0.174	0.204	0.189	-	0.620	0.121	0.077	-	0.754	0.088	0.023	-	0.826	0.111	0.038	-	0.759	0.102	0.039	-
SPRING GULLY 46	0.179	-	-	-	0.735	-	-	-	0.802	-	-	-	0.807	-	-	-	0.799	-	-	-
SPRING GULLY 50	0.233	-	-	-	0.495	-	-	-	0.815	-	-	-	0.837	-	-	-	0.766	-	-	-
SPRING GULLY 51	0.170	-	-	-	0.495	-	-	-	0.821	-	-	-	0.816	-	-	-	0.823	-	-	-
SPRING GULLY 52	0.184	-	-	-	0.591	-	-	-	0.841	-	-	-	0.858	-	-	-	0.727	-	-	-
SPRING GULLY 53	0.231	-	-	-	0.713	-	-	-	0.839	-	-	-	0.770	-	-	-	0.720	-	-	-
SPRING GULLY 54	0.235	0.207	0.186	-	0.744	0.089	0.033	-	0.856	0.086	0.013	-	0.837	0.103	0.029	-	0.774	0.106	0.043	-
SPRING GULLY 55	0.210	-	-	-	0.732	-	-	-	0.847	-	-	-	0.815	-	-	-	0.785	-	-	-
SPRING GULLY 57	0.226	0.204	0.184	-	0.743	0.124	0.060	-	0.816	0.113	0.041	-	0.786	0.106	0.037	-	0.777	0.100	0.033	-
SPRING GULLY 58	0.174	0.204	0.188	-	0.743	0.114	0.052	-	0.821	0.089	0.020	-	0.828	0.078	0.009	-	0.642	0.092	0.027	-
SPRING GULLY 59	0.250	0.189	0.167	-	0.704	0.133	0.073	-	0.794	0.095	0.026	-	0.810	0.105	0.034	-	0.802	0.095	0.027	-
SPRING GULLY 61	0.174	0.217	0.183	-	0.666	0.149	0.061	-	0.899	0.148	0.012	-	0.763	0.180	0.041	-	0.557	0.012	0.004	-
SPRING GULLY 65	0.180	0.152	0.137	-	0.684	0.075	0.034	-	0.784	0.052	0.003	-	0.790	0.068	0.009	-	0.722	0.062	0.007	-
SPRING GULLY 66	0.191	0.151	0.133	-	0.780	0.050	0.012	-	0.816	0.051	0.002	-	0.826	0.061	0.005	-	0.774	0.045	0.003	-
SPRING GULLY 7	0.194	0.159	0.142	-	0.520	0.166	0.124	-	0.818	0.051	0.002	-	0.809	0.067	0.006	-	0.775	0.070	0.018	-
SPRING GULLY 88	0.177	0.165	0.150	-	0.702	0.085	0.039	-	0.843	0.062	0.004	-	0.806	0.075	0.009	-	0.335	-	-	-
SPRING GULLY 9	0.190	0.164	0.147	-	0.713	0.081	0.032	-	0.847	0.058	0.001	-	0.821	0.063	0.004	-	0.772	0.060	0.003	-
SPRING GULLY 90	0.153	0.159	0.145	-	0.638	0.088	0.047	-	0.861	0.042	0.000	-	0.826	0.064	0.006	-	0.646	0.062	0.005	-
SPRING GULLY 96	0.179	0.163	0.147	-	0.720	0.070	0.017	-	0.814	0.061	0.003	-	0.768	0.061	0.005	-	0.534	0.073	0.005	-

Well	Blocky Sandstone Reservoir				J10/TS1 to MFS1				MFS1 to SB2				SB2 to TS3				Ultimate Seal			
	Ave. V_{shale} (v/v)	Ave. PHIT (v/v)	Ave. PHIE (v/v)	Ave. PERM (mD)	Ave. V_{shale} (v/v)	Ave. PHIT (v/v)	Ave. PHIE (v/v)	Ave. PERM (mD)	Ave. V_{shale} (v/v)	Ave. PHIT (v/v)	Ave. PHIE (v/v)	Ave. PERM (mD)	Ave. V_{shale} (v/v)	Ave. PHIT (v/v)	Ave. PHIE (v/v)	Ave. PERM (mD)	Ave. V_{shale} (v/v)	Ave. PHIT (v/v)	Ave. PHIE (v/v)	Ave. PERM (mD)
STRATHVALE 1	-	-	-	-	-	-	-	-	-	-	-	-	0.489	-	-	-	0.603	-	-	-
SUSSEX DOWNS 1	0.192	0.112	0.093	12.000	0.613	0.086	0.039	0.01	0.794	0.126	0.024	<0.01	0.655	0.131	0.044	0.31	0.519	0.144	0.070	120.00
TALLAWALLA 1	0.135	0.211	0.185	3900.000	0.428	0.216	0.121	110.00	0.444	0.208	0.115	6.90	0.407	0.221	0.128	37.00	0.449	0.159	0.089	410.00
TAROOM 17	0.244	0.151	0.121	1200.000	0.691	0.133	0.043	58.00	0.849	0.156	0.021	0.05	0.771	0.149	0.037	17.00	0.749	0.164	0.043	200.00
TASMANIA 1	0.102	0.163	0.156	16.000	0.652	0.077	0.039	0.19	0.855	0.057	0.003	<0.01	0.759	0.061	0.012	3.00	0.628	0.044	0.005	<0.01
TAYLOR 6	-	-	-	-	-	-	-	-	0.726	-	-	-	0.523	-	-	-	0.485	-	-	-
TEATREE 1	0.084	0.211	0.204	230.000	0.706	0.095	0.041	0.02	0.805	0.098	0.034	<0.01	0.736	0.110	0.052	<0.01	0.603	0.071	0.023	5.00
THRUPP 1	-	-	-	-	-	-	-	-	-	-	-	-	0.745	-	-	-	0.685	-	-	-
TIMOTHY 1	-	-	-	-	-	-	-	-	-	-	-	-	0.372	0.156	0.104	-	0.355	0.140	0.105	-
TINTAGEL 1	-	-	-	-	-	-	-	-	-	-	-	-	0.407	-	-	-	0.415	-	-	-
TOBY 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.674	0.131	0.055	-
TOBY 3	-	-	-	-	-	-	-	-	-	-	-	-	0.538	0.183	0.111	-	0.280	0.236	0.198	-
TOBY 4	-	-	-	-	-	-	-	-	-	-	-	-	0.410	0.109	0.075	-	0.725	0.125	0.043	-
TORYBOY 1	-	-	-	-	-	-	-	-	-	-	-	-	0.803	-	-	-	0.494	-	-	-
TRELINGA 1	0.033	0.220	0.217	2000.000	0.632	0.098	0.041	18.00	0.603	0.080	0.026	1.00	0.586	0.130	0.078	0.93	0.630	0.097	0.045	1.10
WAAR WAAR 19	-	-	-	-	-	-	-	-	0.689	0.411	0.146	-	0.685	0.136	0.089	-	0.687	0.141	0.093	-
WAGGAMBA 2	-	-	-	-	-	-	-	-	0.324	0.104	0.102	-	0.457	0.095	0.093	-	0.425	0.108	0.106	-
WAROOBY SOUTH 3	-	-	-	-	-	-	-	-	0.825	-	-	-	0.781	-	-	-	0.785	-	-	-
WARRIOR 1	-	-	-	-	0.588	-	-	-	0.702	-	-	-	0.529	-	-	-	0.369	-	-	-
WASHPOOL 2	-	-	-	-	-	-	-	-	-	-	-	-	0.499	-	-	-	0.494	-	-	-
WEST BRAEMAR 1	-	-	-	-	0.718	0.124	0.075	-	0.773	0.154	0.101	-	0.773	0.131	0.080	-	0.611	0.106	0.063	-
WEST WANDOAN 1	0.096	0.203	0.195	1200.000	0.559	0.087	0.037	3.00	0.607	0.144	0.091	4.70	0.553	0.107	0.057	5.70	0.563	0.092	0.047	8.70
WILLAROO 1	0.058	0.205	0.201	360.000	0.613	0.112	0.068	0.53	0.637	0.106	0.055	0.09	0.781	0.090	0.033	0.20	0.609	0.105	0.060	6.10
WILLOWBE 1	-	-	-	-	0.571	0.225	0.072	-	0.685	0.155	0.048	-	0.641	0.193	0.068	-	0.549	0.211	0.096	-
WINGNUT 1	-	-	-	-	0.220	-	-	-	0.334	-	-	-	0.583	-	-	-	0.595	-	-	-
WINGNUT 2	-	-	-	-	0.162	0.174	-	-	0.451	0.139	-	-	0.614	0.136	-	-	0.637	0.146	-	-
WOLEEBEE CREEK GW4	0.066	0.199	0.193	2000.000	0.515	0.088	0.042	2.00	0.622	0.124	0.070	0.11	0.534	0.118	0.071	7.50	0.595	0.069	0.022	1.70
WOODVILLE 1	-	-	-	-	-	-	-	-	0.529	0.043	0.007	-	0.403	0.034	0.008	-	0.357	0.041	0.018	-
YANCO 1	-	-	-	-	-	-	-	-	-	-	-	-	0.486	-	-	-	0.540	-	-	-
YARRILL CREEK 1	-	-	-	-	-	-	-	-	-	-	-	-	0.455	0.142	0.091	-	0.339	0.168	0.122	-
YULEBA 1	-	-	-	-	0.209	-	-	-	0.453	-	-	-	0.596	-	-	-	0.525	-	-	-

Figure 29 Map showing arithmetic mean of calculated V_{shale} in Blocky Sandstone Reservoir, overlying an isochore of the Blocky Sandstone Reservoir.

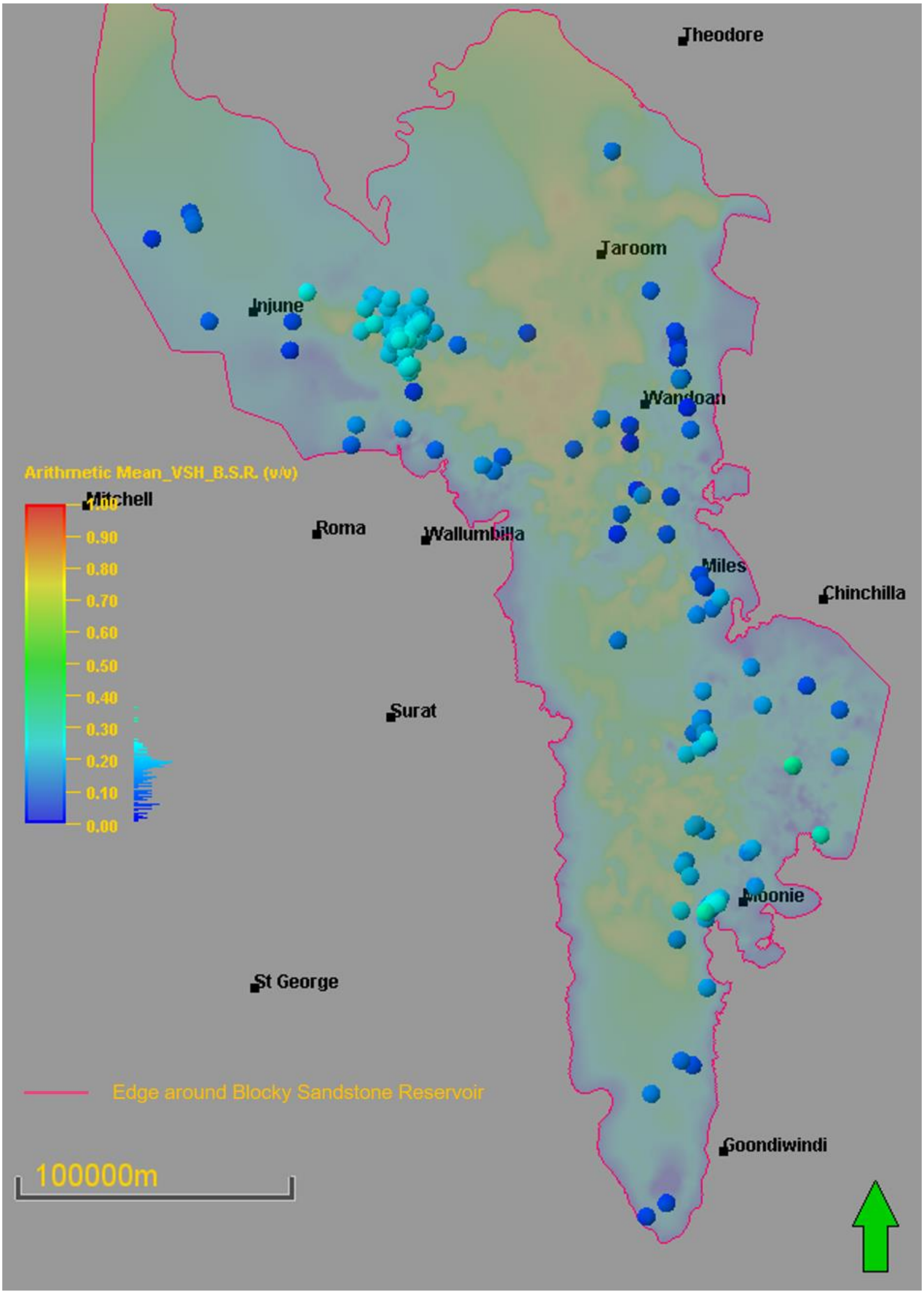


Figure 30 Map showing arithmetic mean of calculated effective porosity in Blocky Sandstone Reservoir, overlying a subsea structural contour map of TS1. Map only displays porosities for wells with porosity confidence levels 3 and 4.

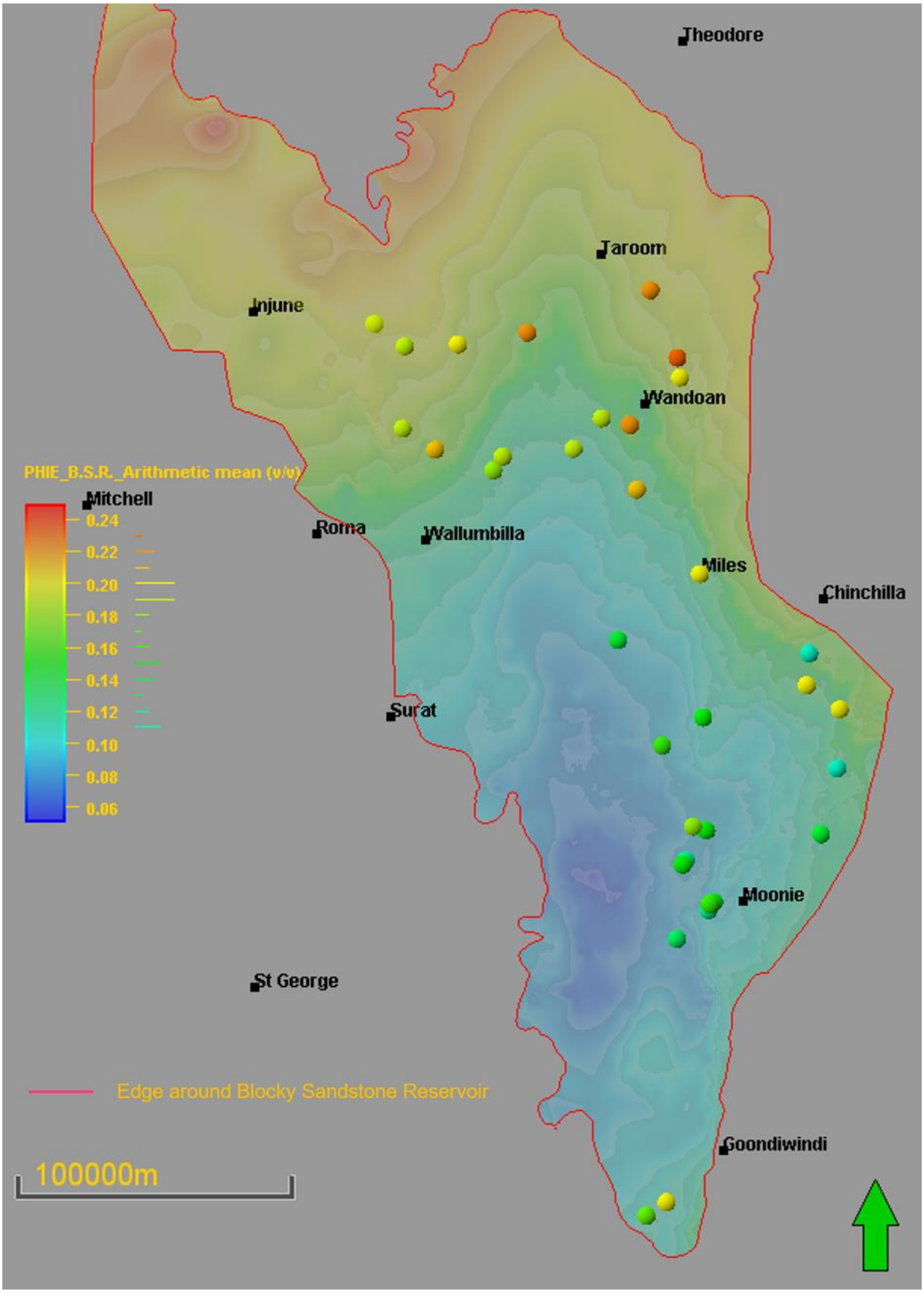


Figure 31 Map showing arithmetic mean of calculated horizontal water in-situ reservoir permeability in the Blocky Sandstone Reservoir. Map only displays permeabilities calculated from wells with porosity confidence levels 3 and 4.

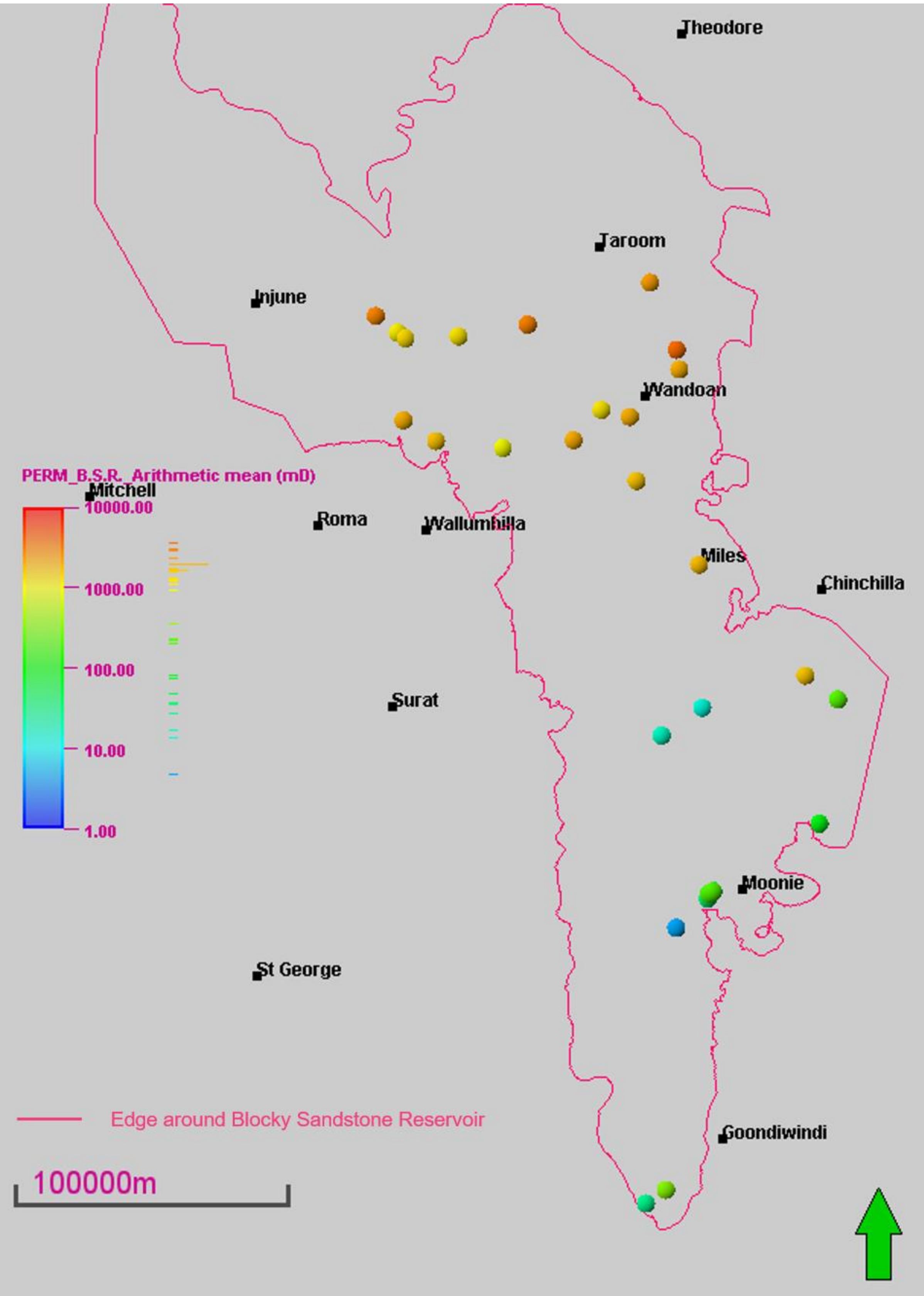


Figure 32 Map showing arithmetic mean of calculated V_{shale} in Transition Zone – TS1/J10 to MFS1, overlying an isochore of TS1/J10 to MFS1.

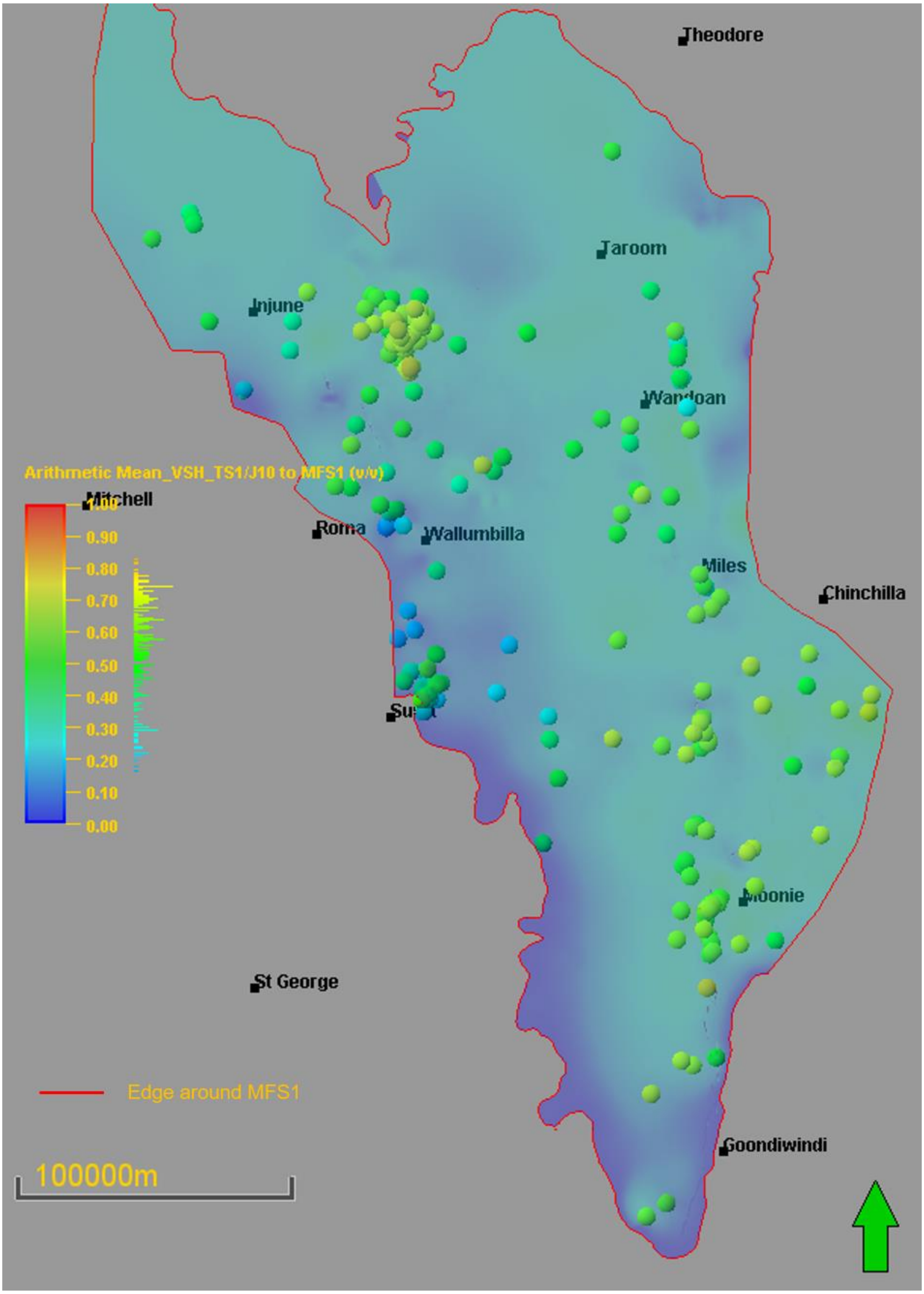


Figure 33 Map showing arithmetic mean of calculated effective porosity in Transition Zone – TS1/J10 to MFS1, overlying a subsea structural contour map of MFS1. Map only displays porosities for wells with porosity confidence levels 3 and 4.

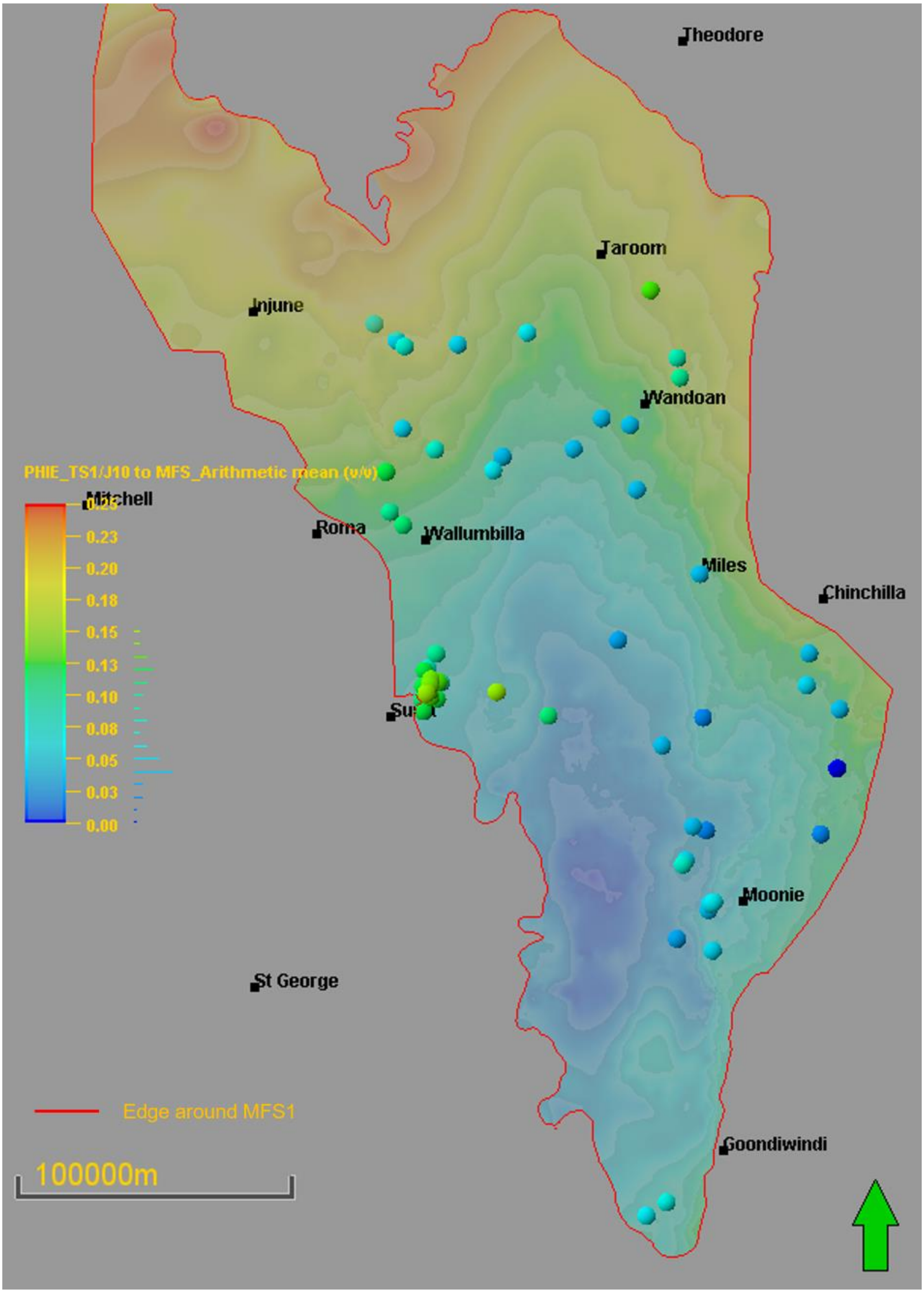


Figure 34 Map showing arithmetic mean of calculated horizontal water in-situ reservoir permeability in the Transition Zone – TS1/J10 to MFS1. Map only displays permeabilities calculated from wells with porosity confidence levels 3 and 4.

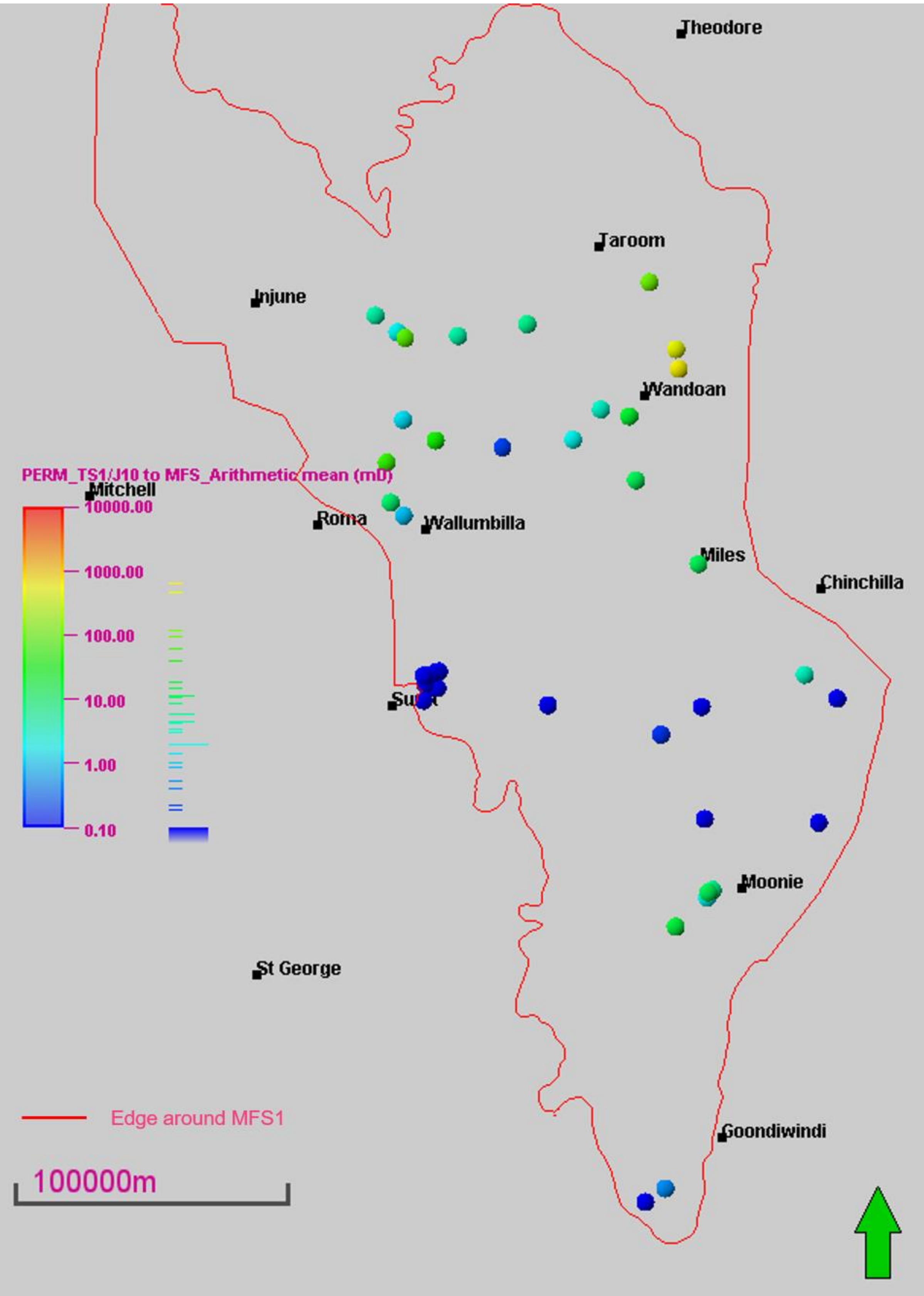


Figure 35 Map showing arithmetic mean of calculated V_{shale} in Transition Zone – MFS1 to SB2, overlying an isochore of MFS1 to SB2.

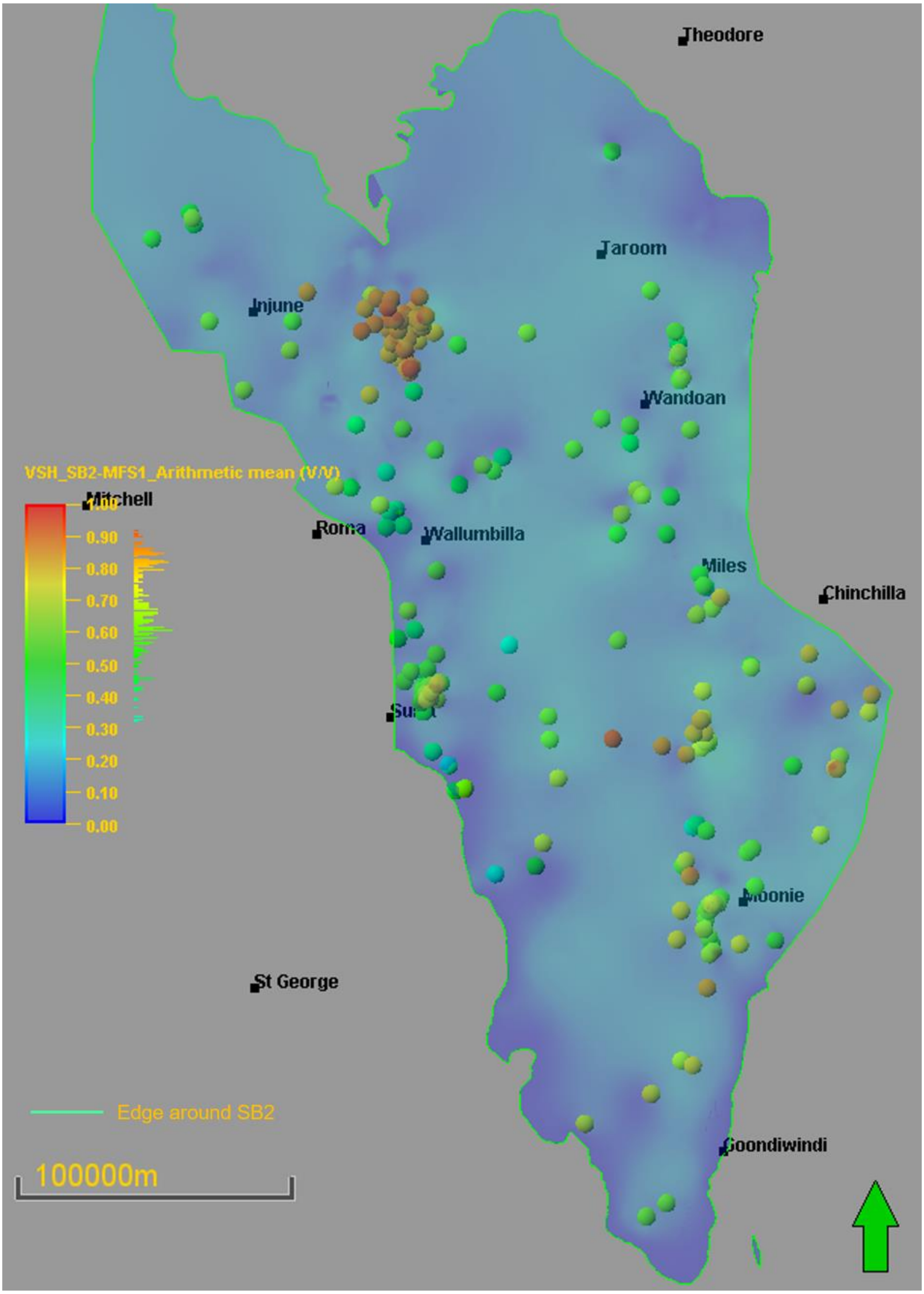


Figure 36 Map showing arithmetic mean of calculated effective porosity in Transition Zone – MFS1 to SB2, overlying a subsea structural contour map of SB2. Map only displays porosities for wells with porosity confidence levels 3 and 4.

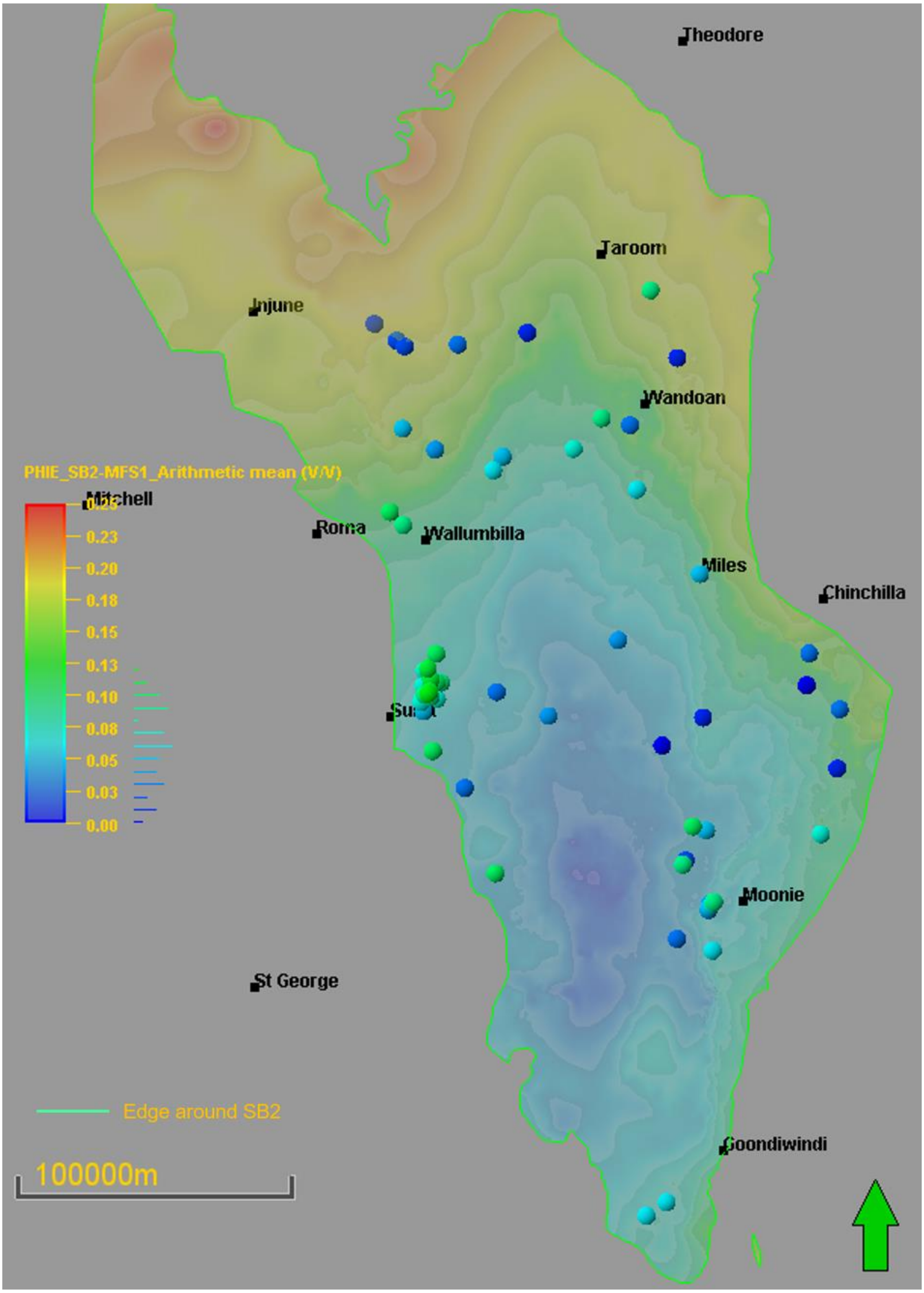


Figure 37	Map showing arithmetic mean of calculated horizontal water in-situ reservoir permeability in the Transition Zone – MFS1 to SB2. Map only displays permeabilities calculated from wells with porosity confidence levels 3 and 4.

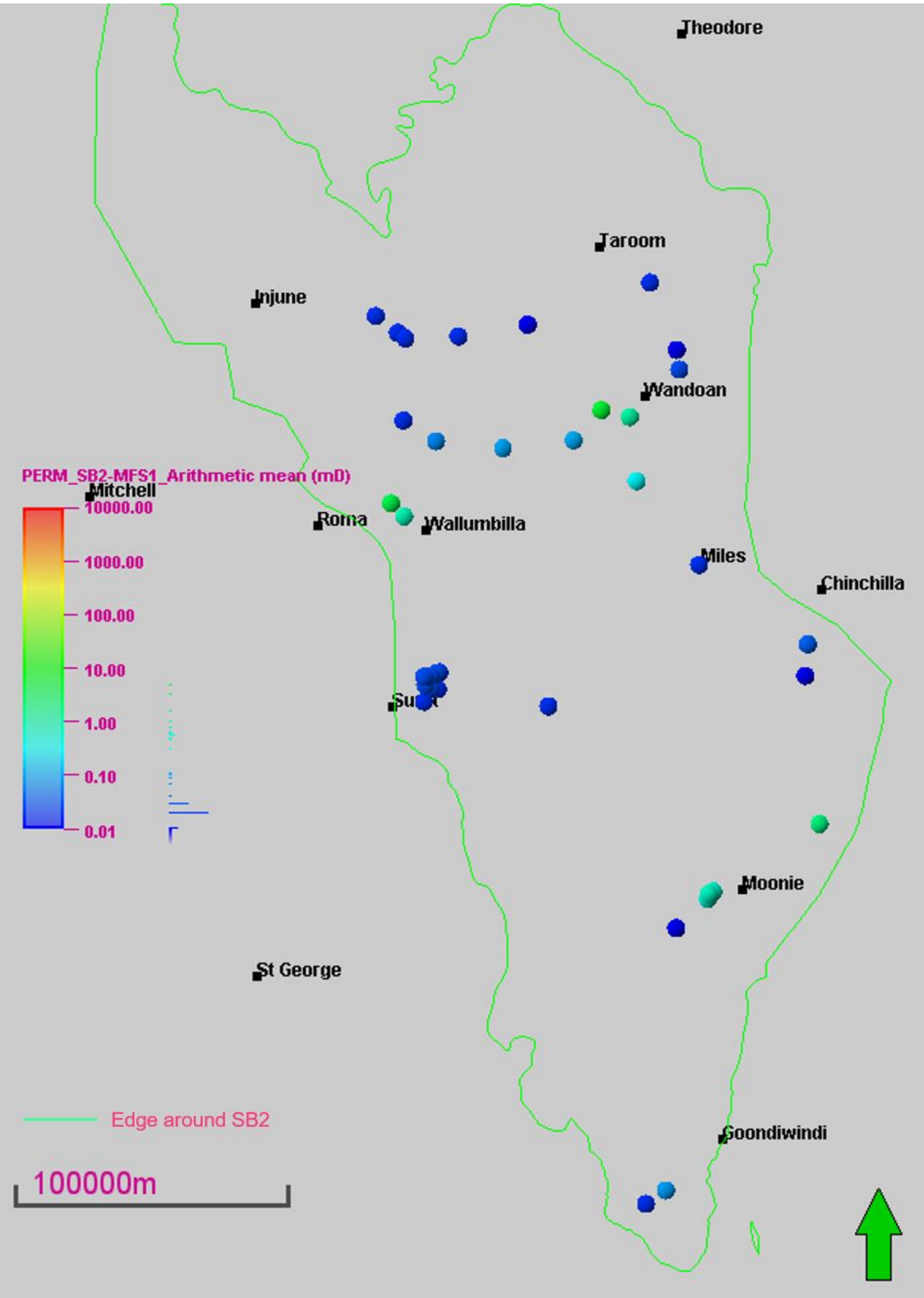


Figure 38 Map showing arithmetic mean of calculated V_{shale} in Transition Zone – SB2 to TS3, overlying an isochore of SB2 to TS3.

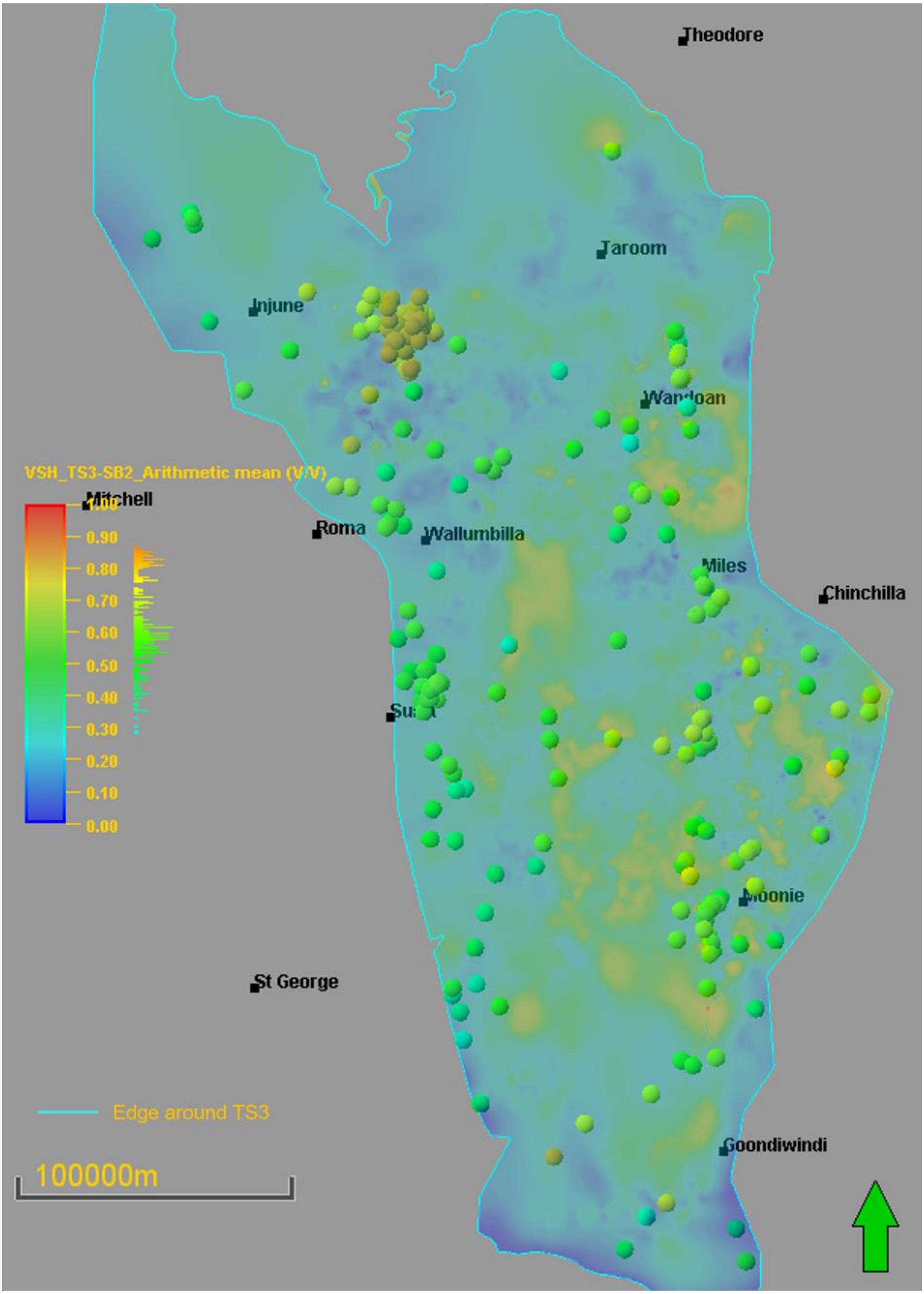


Figure 39 Map showing arithmetic mean of calculated effective porosity in Transition Zone – SB2 to TS3, overlying a subsea structural contour map of TS3. Map only displays porosities for wells with porosity confidence levels 3 and 4.

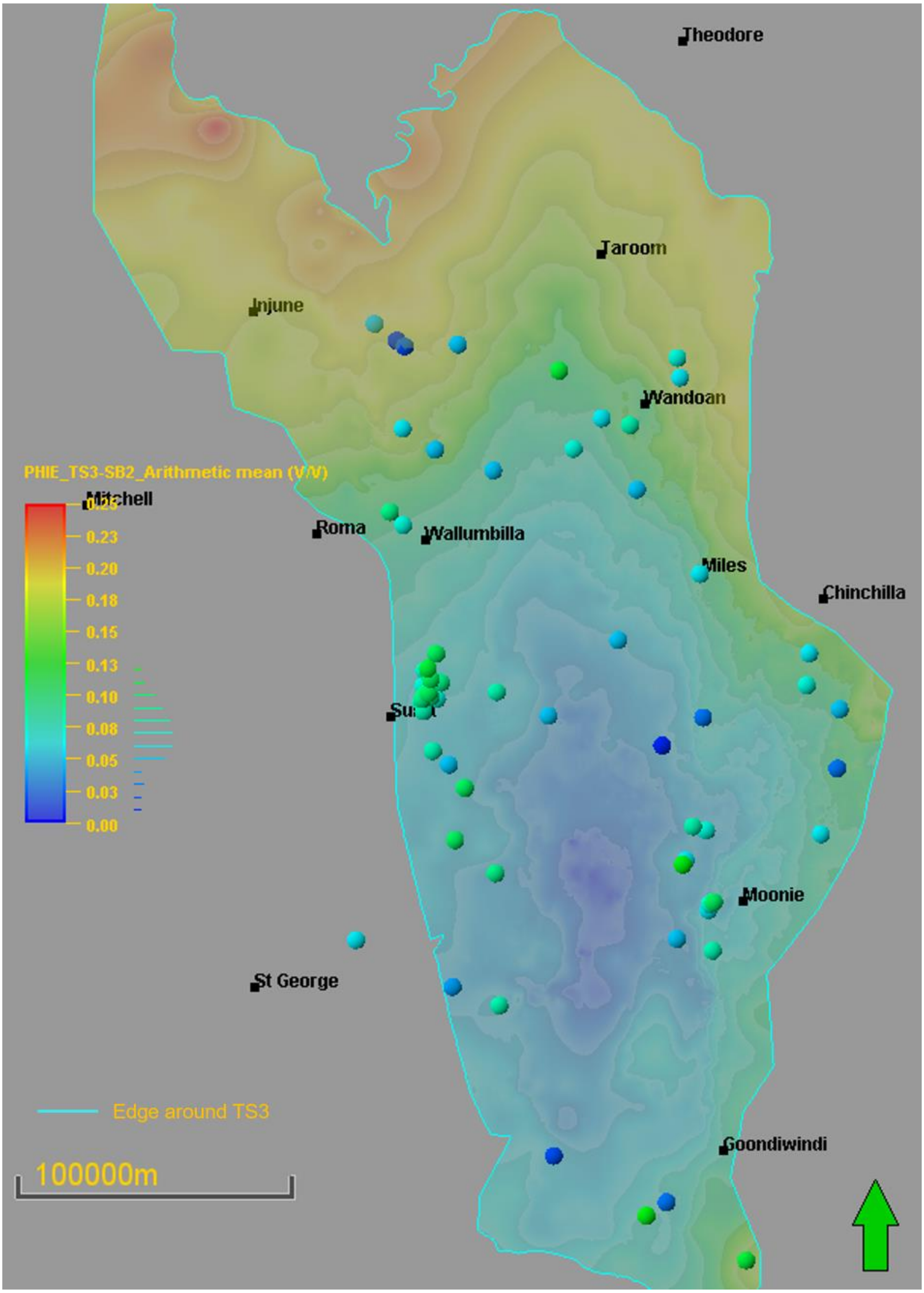


Figure 40 Map showing arithmetic mean of calculated horizontal water in-situ reservoir permeability in the Transition Zone – SB2 to TS3. Map only displays permeabilities calculated from wells with porosity confidence levels 3 and 4.

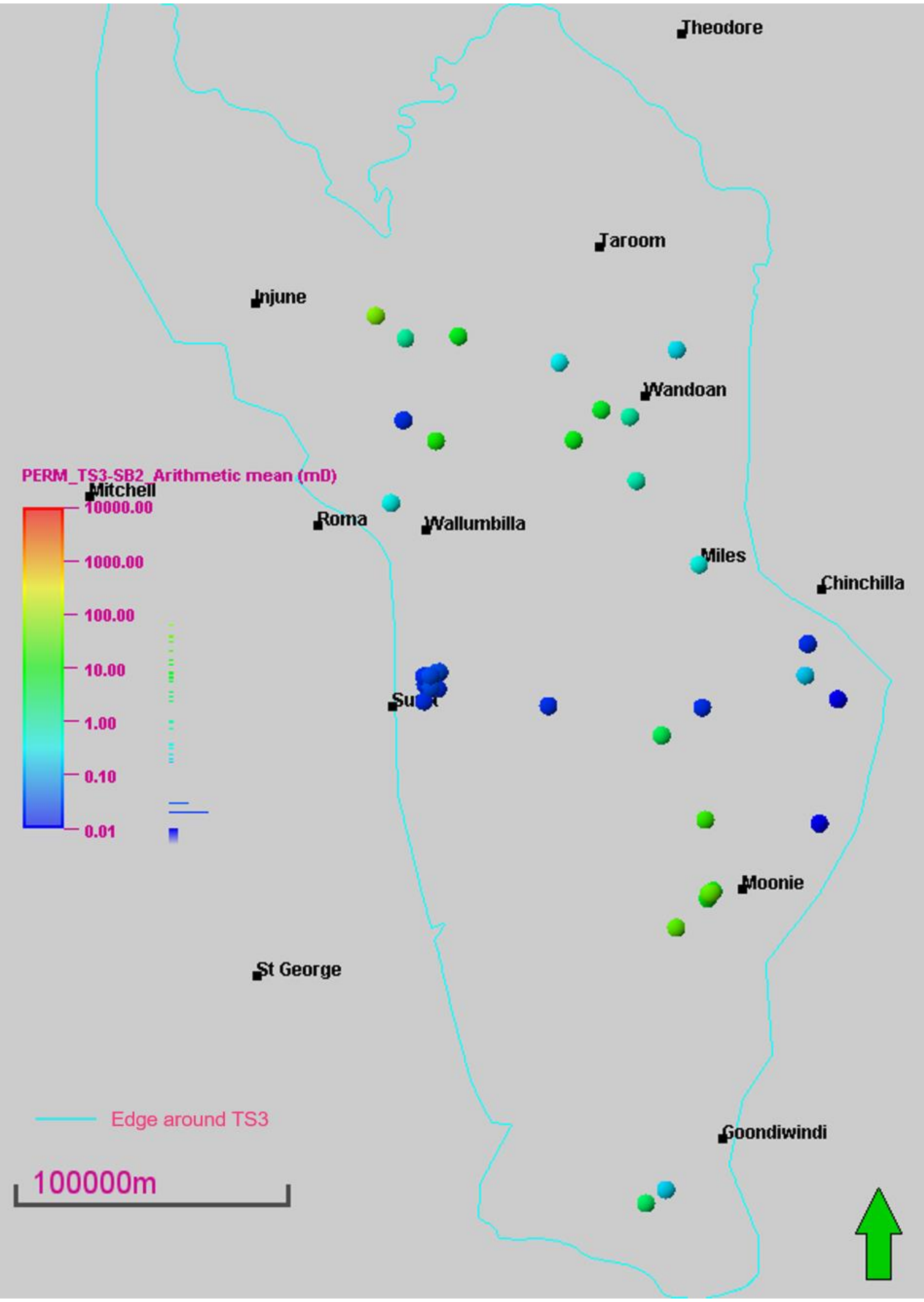


Figure 41 *Map showing arithmetic mean of calculated V_{shale} in the Ultimate Seal, overlying an isochore of the Ultimate Seal.*

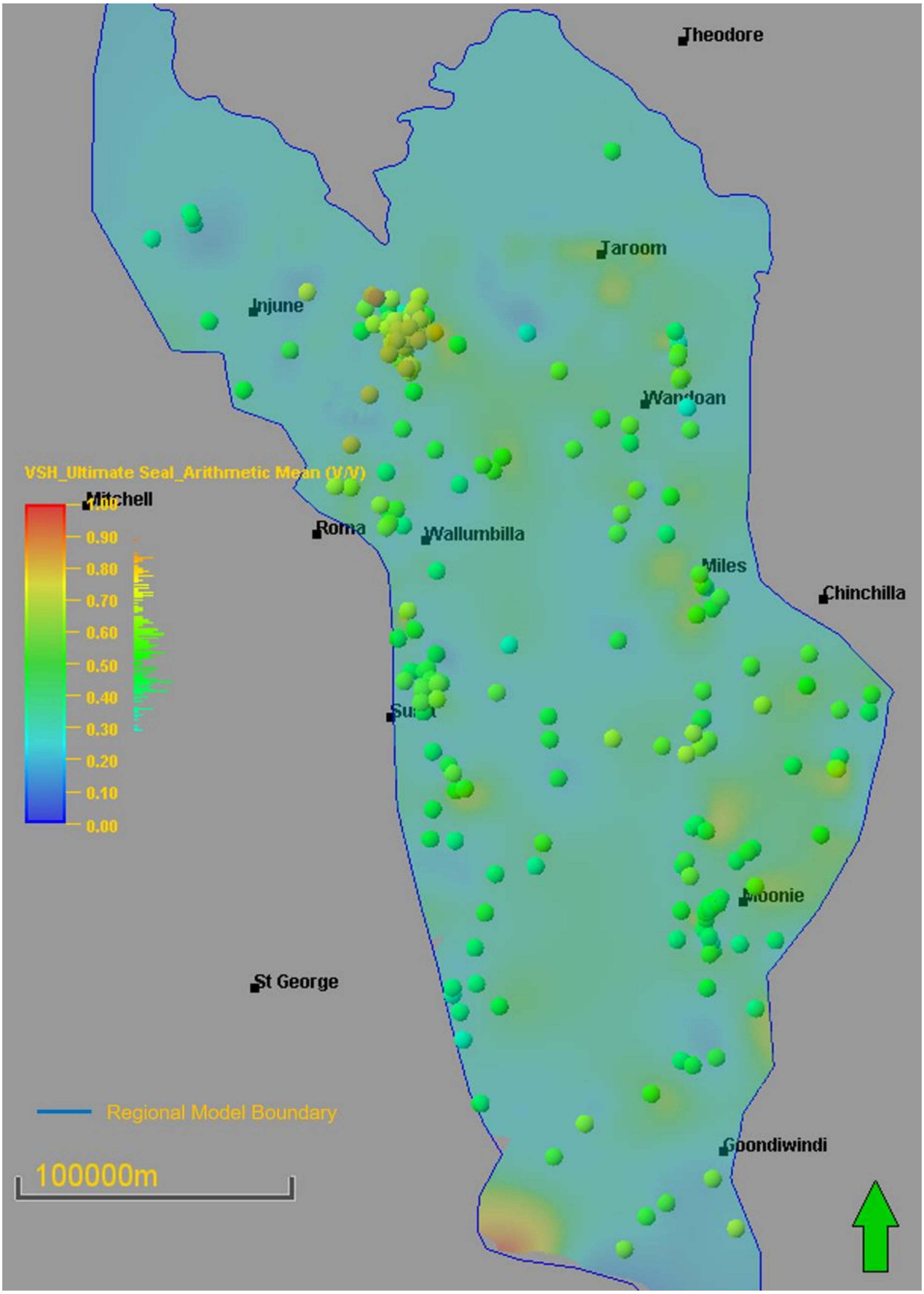


Figure 42 Map showing arithmetic mean of calculated effective porosity in the Ultimate Seal, overlying a subsea structural contour map of J30. Map only displays porosities for wells with porosity confidence levels 3 and 4.

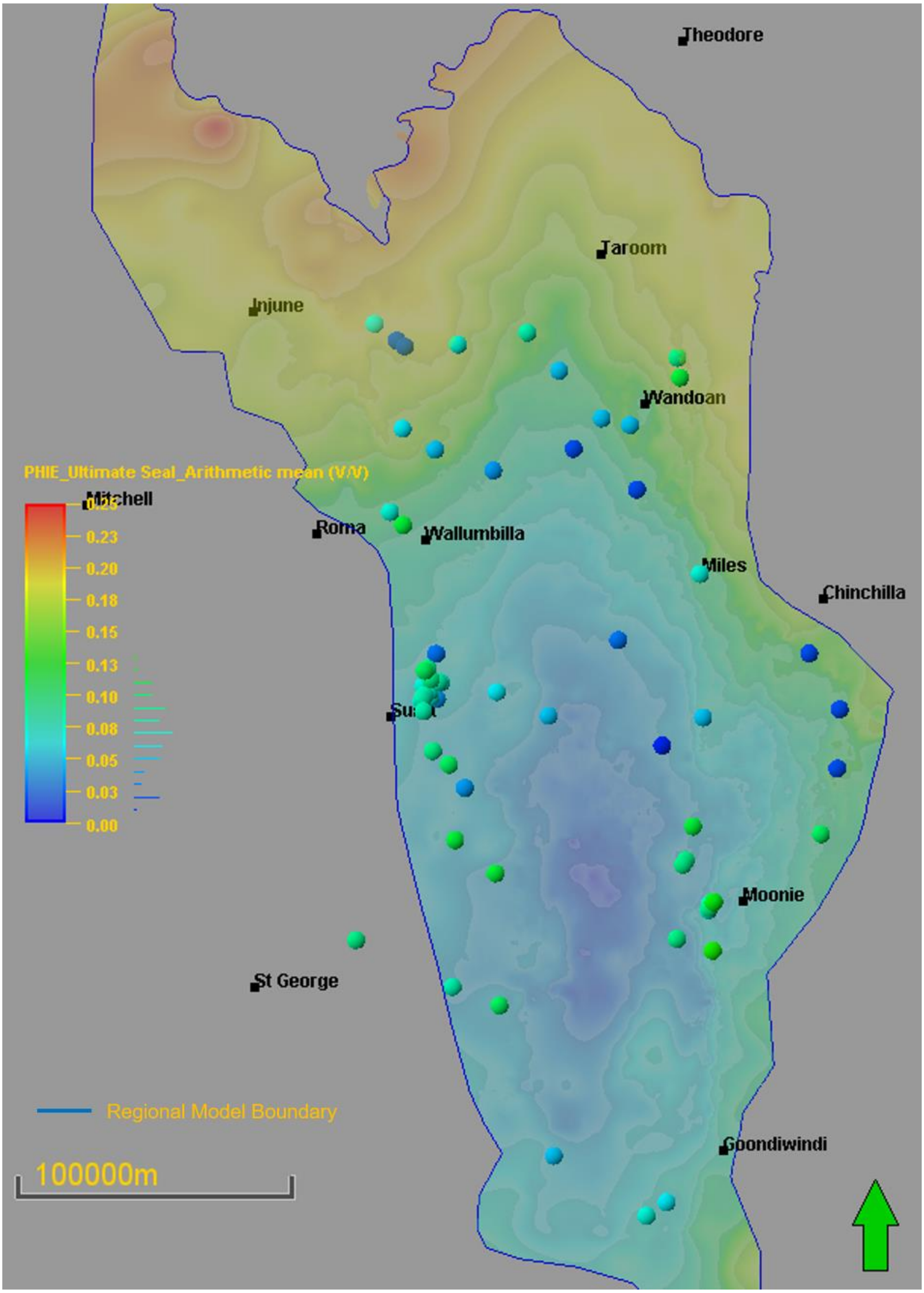


Figure 43 Map showing arithmetic mean of calculated horizontal water in-situ reservoir permeability in the Ultimate Seal. Map only displays permeabilities calculated from for wells with porosity confidence levels 3 and 4.